NATIONAL CAR BUILDER

VOLUME XII. NUMBER 6.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

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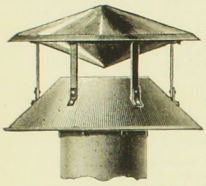

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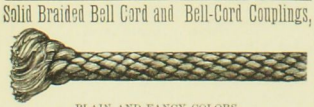

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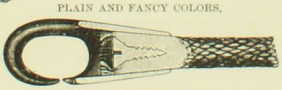

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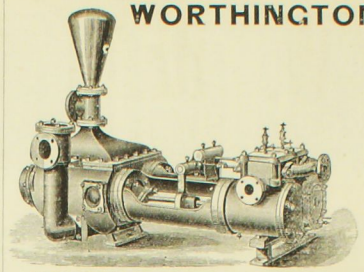

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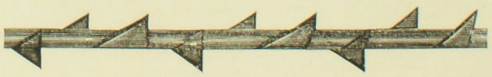

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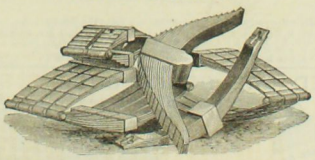
EXTRA TEMPERED,  LIGHT ELLIPTIC

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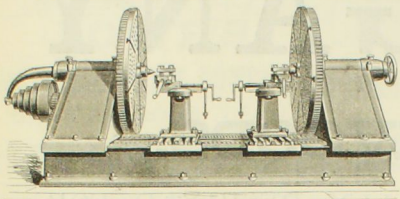

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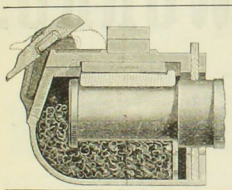

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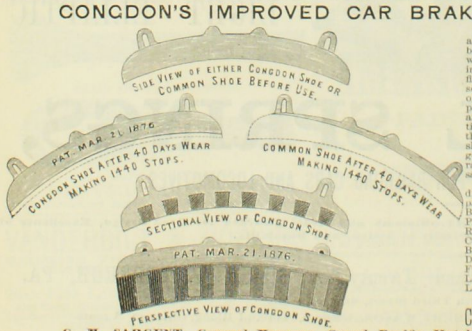

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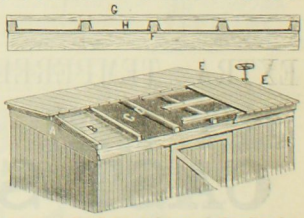

A Carline or Main Rafter. *B* Sub or under boarding. *C* Asphalt Felt, and when on Car painted with imperishable Asphalt paint. *D* Felt Cap or Sub Rafter. *E* Upper board roof. *F* Sub Rafter. *G* Stringers on Sub Rafters. *H* Air Space between the Felt and upper board roof.

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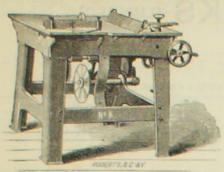

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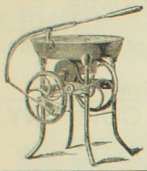

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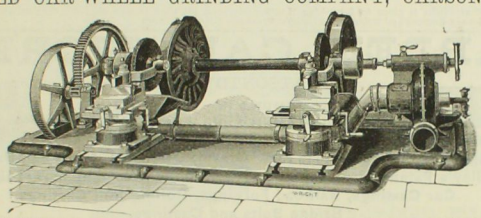

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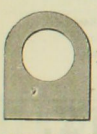

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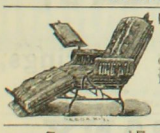

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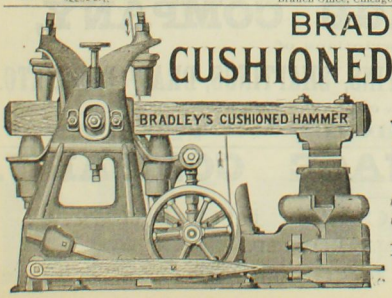

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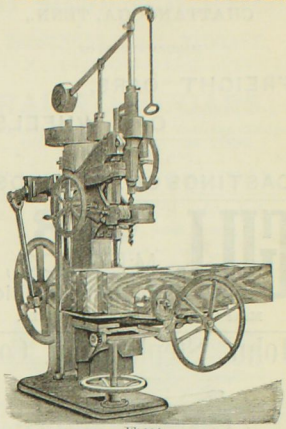

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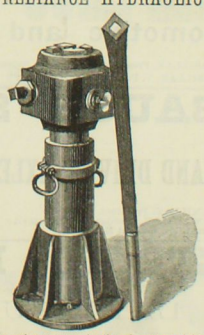

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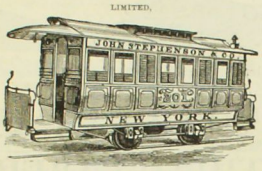

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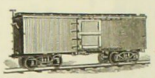

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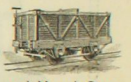

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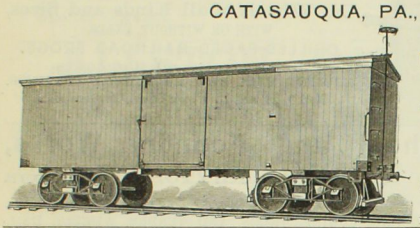

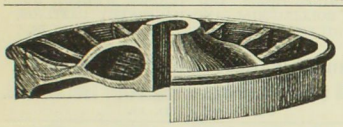

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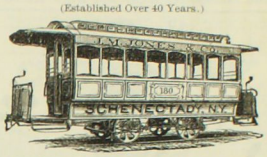

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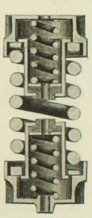

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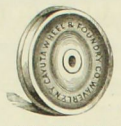

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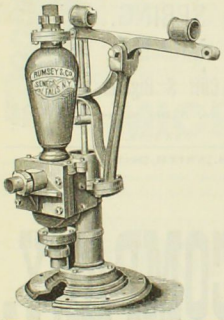

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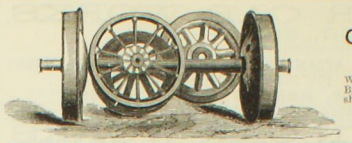

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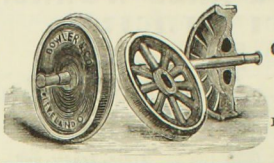

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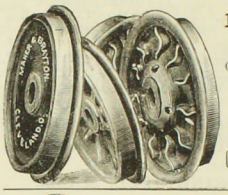

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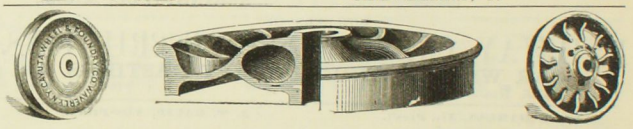

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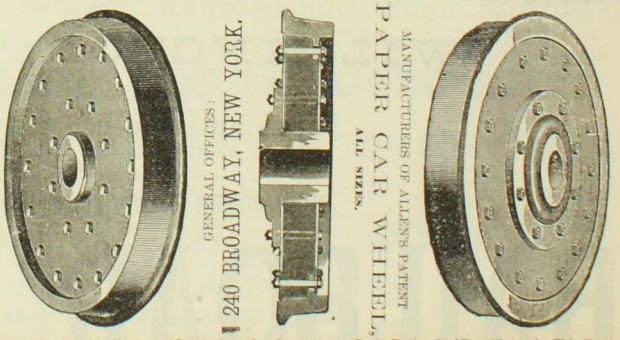

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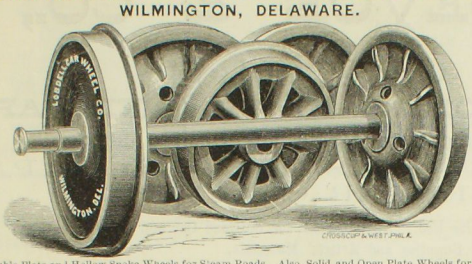
LOBDELL CAR WHEEL CO.,
WILMINGTON, DELAWARE.



Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

GEO. G. LOBDELL, President. W. W. LOBDELL, Secretary. P. N. BRENNAN, Treasurer.

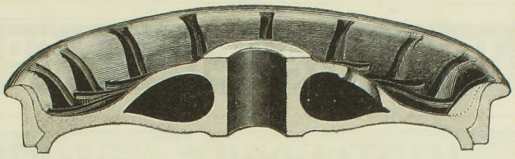
W. D. WOOD & CO'S

PATENT
PLANISHED SHEET IRON
Patented March 14, 1865; April 8, 1873; Sept. 9, 1873; Oct. 6, 1874; Jan. 11, 1876.
Guaranteed fully equal, in all respects, to the
IMPORTED RUSSIA IRON,
And at a much less price.
Locomotive Jacket Iron
Our Specialty.
For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their office,
111 Water Street, Pittsburgh, Pa.

ALLSTON CAR WHEEL COMPANY.

We would respectfully call the attention of Railway Officials to the
"Washburn"
Pat. Homogeneous Metal-Tired Car Wheels
Manufactured by this Company.

THE TIRES.—The material composing the whole Tire of this wheel—being two inches thick on the tread—is OUR SPECIALTY, being a combination of metals, the union of same never having before been accomplished for same purpose.



DURABILITY.—With these advantages of material and construction,—embracing the tenacity, hardness and durability of the *Best Cast Steel-Tired Wheels*—*we claim* that they will do as much *hard work* as any Steel Wheel now in use, and with less danger to life and property, and are ready to guarantee them to that end.

USES.—They are adapted to any service and to all places where Steel Tired or the ordinary Chilled Wheels are used, while the *Cost* (being on a small percentage over chilled wheels), compared with their *mileage*, makes them the *cheapest Wheels* on the face of the globe.

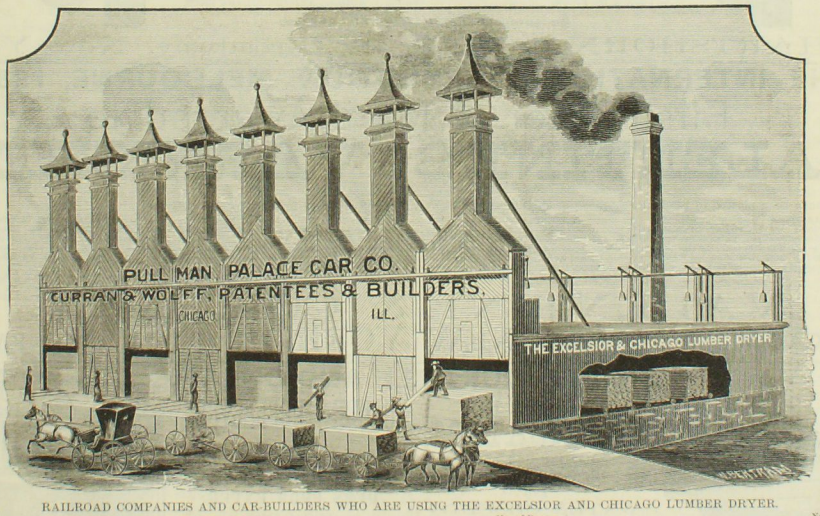
OFFICE:
19 Batterymarch Street, Boston, Mass.

FRED. A. HOUDLETTE & CO.

WORKS:
Allston, Mass.

THE EXCELSIOR AND CHICAGO LUMBER DRYER
IS BUILT UNDER 16 PATENTS.

PAYS FOR ITSELF EVERY YEAR.
Storing Capacity, 40,000 feet Inch Lumber.



DRYING 8,000 FEET PINE LUMBER EVERY 24 HOURS.

RAILROAD COMPANIES AND CAR-BUILDERS WHO ARE USING THE EXCELSIOR AND CHICAGO LUMBER DRYER.

	No. of Dryers.
Pullman Palace Car Company, Chicago	8
Wells & French Co., Chicago	3
C. & N. W. Railroad, Chicago	3
Flint & Pere Marquette R. R., Saginaw	1
Peninsular Car Works, Detroit	1
Michigan Car Company, Detroit	2
Memphis & Charleston Railroad, Memphis	1
Ohio Falls Car Company, Jeffersonville, Ind	2
Indiana Car Company, Cambridge City, Ind	1
Haskell & Barker Company, Michigan City, Ind	1
Denver & Rio Grande Railway, Denver, Col	2
Atchison, T. & S. Fe Railway, Topeka, Kan	1
Barney & Smith Company, Dayton, O	4
Missouri Car & Foundry Co., St. Louis	1
Blaln Bros., Huntington, Pa	1
U. S. Rolling Stock Co., Chicago	2

CURRAN & WOLFF, Proprietors and Builders, 39 and 41 FRANKLIN STREET, CHICAGO, Ill.

F. W. DEVOE & CO.,

MANUFACTURERS OF

DRY COLORS.

COACH AND CAR COLORS IN OIL AND JAPAN.

Special Colors Compounded to Match any Desired Shade.

FINE RAILWAY VARNISHES AND JAPANS FOR PASSENGER COACHES.

Also Freight Car, Caboose and Bridge Paints Ready for Use. Fine Brushes for Railroad Car and Coach Painting. All Kinds of Painters' Supplies and Artists' Materials.

Railroad Companies will save themselves great trouble in painting by allowing F. W. Devoe & Co. to prepare their Passenger and Freight Car Colors. This will insure DURABILITY UNIFORMITY and ECONOMY. As we manufacture from the crude materials, which are the component parts of any shade, we understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them. SEND FOR CATALOGUES AND LISTS OF SAMPLE COLORS.

F. W. DEVOE & CO.,

Cor. Fulton and William Streets, NEW YORK.

MANUFACTURERS OF RAILWAY CAR VARNISHES **JOHN BABCOCK & Co** NO. 2 LIBERTY SQUARE BOSTON, MASS

HARTSHORN'S SELF-ACTING SHADE ROLLERS.

SOLD ALL OVER THE WORLD.

SPECIALLY ADAPTED TO RAILWAY CARS AND ROAD CARRIAGES.

Carry Shades of any Size or Weight. Do not get out of order. ALL ROLLERS WARRANTED. Used on many of the Principal Railroads through the Country. MODELS AND CIRCULARS FREE.

Be sure you get Hartshorn's Rollers.

S. HARTSHORN, - - No. 486 Broadway, New York.

THE INTERNATIONAL EXHIBITION MELBOURNE, 1881.

First Order of Merit Awarded to

VALENTINE'S VARNISHES.

We have been pleased to receive the following announcement from our representatives in Melbourne, Australia:

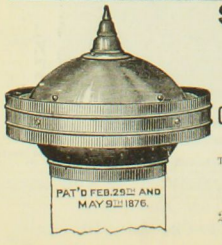
MESSRS. VALENTINE & CO., NEW YORK: MELBOURNE, AUSTRALIA, March 21, 1880.

GENTLEMEN: By this we have the pleasure to inform you that your exhibit of Varnish has the honor to rank in the highest place in our International Exhibition, and stands alone for the first Order of Merit for Varnish by itself without any other goods to help it; and it is the only Varnish that has obtained *First Order of Merit against all comers*. We congratulate you upon the position you take, for the competition was great. Some of the English makers have magnificent shows, got up regardless of expense, and you may fancy we have been interested in the result, but were confident; and what makes it more valuable is the fact that it is the only First Order of Merit for Varnish *alone*, which was secured without your Varnish being exhibited in connection with other goods, to make the exhibit more attractive to the eye. * * *

Yours truly, (Signed) HENRY BOX & SON.

VALENTINE & COMPANY,

CHICAGO. NEW YORK. PARIS.



SIMPLE, DURABLE AND CHEAP.

GLOBE **VENTILATORS,**

For Ventilation of Cars Depots, Round-Houses AND WATER CLOSETS.

Twenty-five Sizes, from 2 in. to 48 in. inclusive.

GLOBE DEFLECTORS,

FOR PREVENTING DUST OR CINDERS FROM ENTERING CARS.

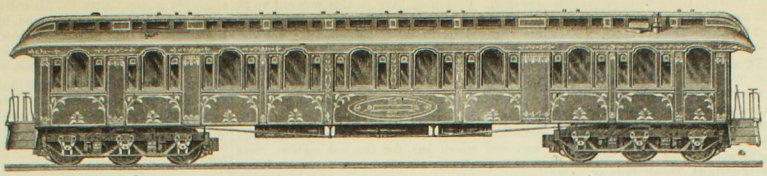
MANUFACTURED BY THE

GLOBE VENTILATOR COMPANY,

203 River Street, TROY, N. Y.

Catalogue and Price-List Furnished on Application.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XII. NUMBER 6. | JUNE, 1881. | SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Miscellaneous Items.

THE Detroit Car Spring Company is full of work, and employs a force sufficient to turn out 15 tons of spiral springs, and 40 full sets of elliptics per day.

THE Cleveland shops of the C., C., C. & I. road have just completed two mogul engines, and are engaged upon two more. They have 18 × 24 cylinders, 4 ft. 8 in. drivers, and boilers 50 inches in diameter, with 150 2-in. flues 11 ft. long. The fire-boxes are 6 ft. 2¼ in. long, 5 ft. 7½ in. high, and 35⅜ in. wide. They have steel cross-heads and axles and cast iron links, and the link-lifters have a right and left nut, the same as the valve stem, to equalize the cut-off. Homogeneous open hearth steel is used for all new axles for engines, tenders and coaches.

THE Peninsular Car Works, of Detroit, employ 600 men, and are building box, stock, and coal cars. Although the company is comparitively a new one, it is full of orders and has already won an established reputation for first-class work. Their machinery and tools are of the best. The wheel foundry has a capacity for turning out 100 wheels a day. The iron used is Salisbury, Lake Superior and Shelby, Ala. In connection with these works are those of the Detroit Steam Forge Co., employing 100 men and turning out 80 car axles a day, besides a large amount of engine and other work.

THE Pullman Car Works, at Detroit, are engaged upon 25 passenger cars for the New York Manhattan Elevated, being the last of a contract for 75. A large number of other contracts are also in hand, including 15 day coaches and 6 sleepers for the Atchison, Topeka & Santa Fe, 6 sleepers for the C., B. & Q., 10 coaches and 11 sleepers for the Denver & Rio Grande, and others of the same classes for various roads, besides a number of officers' and pay cars. The force employed averages over 1,000 men. A large quantity of cabinet and ornamental work is prepared here and sent to the company's works at Chicago.

THE New York, Pennsylvania & Ohio road had thirty consolidation locomotives built with water-grates, 10 ft. × 2 ft. 9 in., for burning bituminous coal, other roads having recommended them for that as well as for burning anthracite. They were found to be very wasteful in permitting so much coal, burned and unburned, to fall through into the ash-pan, from which it frequently dropped on the track, and set fire to ties and bridges. Mr. Wm. Fuller, the General Master Mechanic, has had them taken out, and has put in shaking-grates, 7 ft. long, leaving 3 ft. of dead grate next to the flues. In this way he saves thirty per cent. of coal, avoids setting fire to ties and bridges, and makes the engines steam better.

THE Cleveland Bridge & Car Works have just completed for the Valley R. R. four caboose cars, and one combination baggage, express and mail car 45 feet long inside. They are building 300 twenty-ton gondolas for the C., C., C. & I. road, and street cars for lines in Youngstown and Toledo, Ohio, and Topeka, Kansas; also several summer street cars for a Cleveland line. Orders are also in hand for 800 box cars for the N. Y., Pe..n. & Ohio; 300 gondolas and 100 box cars for the Buffalo, Pittsburg & Western; and 50 each, gondola and box, for Utica & Black River. A six-ton four-wheeled dump car of their own design is also under construction, and will be of such strength that a stone weighing a ton may be dropped into it from an elevation of six feet without injury to the car.

THE Michigan Car Co., Detroit, are now working 2,000 men, and have contracts in hand for 500 box and 500 flat cars for the Chicago, Milwaukee & St. Paul, 600 box cars for the Northern Pacific, 250 coal cars for the Ohio Central, 700 box and flat cars for Michigan Central, and 500 box cars for the Grand Trunk, besides repairing and rebuilding an average of 10 cars a day for various roads. The car work is greatly facilitated by the large number of patterns accumulated by the company in its previous business. The quantity of material it has on hand is enormous, and additions are constantly being made to it. In the foundry for miscellaneous castings, 60 tons of iron are melted per day, and 80 tons in the wheel foundry, the latter being equivalent to 280 wheels. The consumption of wrought iron is very nearly the same. The stock of pig iron on hand is estimated at 6,000 tons.

THE Wabash, St Louis & Pacific car shops, at Toledo, Ohio, are very busy upon new work and repairing. A force of about 400 men is employed. The new work in hand consists of 300 stock, 300 twenty-ton coal, 15 baggage, and two pile-driver cars. The latter are very strongly constructed and have two body bolsters so the trucks can be shifted back toward the center. The company are also having 300 stock, and 350 coal cars built at the Peninsular Works, at Detroit, 3 dining cars at Dayton, Ohio, 10 coaches at Springfield, Mass., and 4 coaches at Troy, N. Y. The car-builders' standard axle has been fully adopted by the company, also a standard truck, of which we have been promised drawings for illustration in a future issue. Mr. Kohler, the master car-builder, has invented a new safety stove for coaches and baggage cars. It is a handsome design, small and compact, the fire being confined so it can not escape in case the stove is upset or displaced.

THE Lake Shore & Michigan Southern road is building at its Buffalo shops two baggage cars 42 ft. long over the sills, 9 ft. 6 in. wide, 6 ft. 4 in. from plate to sills, and 9 ft. 4 in. from the bottom of sills to top of clear-story. They have only one door on a side, and no truss-rods. The center of the car is held up by diagonal rods—three on each side of each door, and running down toward the center—the first from the bolster is ⅞ in., the second ¾ in. and the third ⅝ in. in diameter, and all have a larger piece welded on the ends for the screw-threads. Their outside sheathing is glued together at the edges and upon the car frame; the panel strips and moldings are also glued on, and the inside lining is all put on with glue and nailed in the usual way. The frame of each side of the clear-story, including the bottom rail plate and posts, are built on a timber set on "horses" and put on the car afterward; these also are put together with glue, and built with the proper camber, and so become supports to the roof and frame, instead of an additional weight to be held up.

ONE of the standard locomotives of the New York & Harlem road has recently been rebuilt, and another is in the shop for that purpose. The cylinders are 17 × 24 in., driving wheels 5½ ft., boilers 48 in. inside. When loaded for service they weigh 73,000 lbs., 50,000 of which are on the drivers. They have the Buchanan water-table and the extended smoke-arch. These improvements have worked satisfactorily upon this road as well as upon the Hudson River division of the New York Central. Their economical fuel consumption is illustrated by the following record of engine No. 34, which is copied from the record book kept in the round-house. In six consecutive round trips between New York and Albany (a distance of 143 miles) the locomotive ran 1,716 miles, burned 44,106 lbs. of coal, and hauled 68 cars, an average of 13⅛ cars to the trip. This gives an average of 25.7 lbs. of coal to the mile run, 2.27 lbs. per car mile, and 77.8 miles to ton of coal. The average speed was 37½ miles per hour. Another engine with these improvements ran over 140,000 miles in 15 months without being off her wheels.

THE Fort Wayne, Ind., shops of the Pittsburg, Fort Wayne & Chicago road have six engines on the stocks, and are turning out a new one once a month. The last of six new switching engines is now being finished. They have six wheels, and are built so that the strength and weight are where they are most needed, the frame forward of the front jaws being heavy and thoroughly braced and bolted; heavy lugs, 10 inches high, receive and support a 1¼ × 10-inch plate, notched to the lower side of frame. Against this plate is bolted the bumper-beam, which is so strong as to be proof against damage in any ordinary collision with cars or engines. The system of duplicate parts has been brought to great perfection by Mr. Boon, the master mechanic. First-class workmanship and material, regardless of first cost, are considered the most economical, the repairs being lighter and engines lose less time. This is exemplified in the use of brass driving-boxes, instead of the ordinary kind. Mr. Boon favors steel boilers, stay-bolts and all; and although they give some trouble, he thinks it is due less to the material than to the manufacture, in which there has of late been much improvement, and correspondingly less trouble. The car department is turning out eight freight cars a day, besides keeping up current repairs. The works employ at present about 1,100 men.

MR. JAMES TILLINGHAST, late general superintendent of the main line, and who was recently appointed assistant to the president of the New York Central & Hudson River road, began railroading on the line in 1850 as a fireman. In 1852 he went to the Rome & Watertown road as its master mechanic, and in 1856 became connected with the Collingwood railroad in Canada, holding the position of master mechanic and assistant superintendent. In 1863 he was a proprietor of a line of steamers plying between Sarnia and Chicago, in connection with the Grand Trunk railway. One year later he became master mechanic of the Michigan Southern railroad, and in 1865 was appointed assistant superintendent of the Buffalo and Erie railroad. Before this year expired, Mr. Tillinghast was offered the position of division superintendent of the New York Central railroad by the late Dean Richmond, which he accepted. In 1869 President Vanderbilt made him general superintendent of the New York Central, with full charge of the lines west of Troy and Albany. For a short time he was president of the Canada Southern railway, but had to relinquish the position on account of the pressure of other duties. Mr. Tillinghast is a man of rare executive ability, thoroughly posted in everything that pertains to a railroad, polite and sociable in his intercourse with his associates, and is considered by those who are posted in railway management as the ablest railroad man in this country.

A PARTY of English railway managers, among whom are the Duke of Sutherland and Mr. George P. Neele, superintendent of the London & Northwestern, are now on a tour of inspection in this country to ascertain, from their own observation, whether there are any features peculiar to our railway system that can be introduced to advantage upon the above named line. The transportation of baggage, as well as of passengers, will be studied in all its details, and particularly our system of checking baggage instead of registering it as they do in England. As regards passenger coaches, Mr. Neele thinks that those on his line, which are a combination of the Pullman and the conventional English coach, give fully as much satisfaction as those on our roads. Still, as there is always something new to be learned from the working of every system, any American ideas of value would find ready appreciation. The elevated roads will, of course, receive due attention, although they at present form no part of the system of the London & Northwestern.

THE Buffalo, New York & Philadelphia road has recently received the last of 50 box and 300 gondola cars built for it by the Michigan Car Co. They have diamond trucks and standard M. C. B. axles, and are built to carry a load of 20 tons. The Baldwin Locomotive Works are building for the road two 10-wheeled locomotives, which will weigh 83,000 lbs., of which 63,000 are on the drivers. They will have 18 × 24 cylinders, 4 ft. 7 in. drivers; smallest boiler ring 51 in. in diameter. The road has four passenger coaches that were painted in light colors six years ago, and which have just been revarnished, but there was no necessity for repainting. About three years ago the road had several coaches painted in dark colors. They now need to be repainted, and light colors are being substituted for dark, as being the most economical.

AT the Erie (Pa.) Car Shops, square freight car trucks are secured by first squaring the wheels, which is done by placing them against four shoes, one on the outside of each wheel. These shoes have dowel pins that fit holes in the rails at such points as to hold the wheels exactly square on the track. Wooden blocks wedged against the inside of the wheels hold them against the shoes, till the whole truck is assembled and ready to turn out of the shop. Four men have in this way put up 35 diamond freight car trucks in a day. The shops are engaged in finishing 200 gondolas for the Indianapolis & St. Louis, and they also have in hand 800 box cars for the New York, Penn. & Ohio.

THE Elmira (N. Y.) *Advertiser* speaks of the retirement from service of an ancient, camel-back, switching engine, built at Baltimore thirty years ago, and which has for the last sixteen years been in service on the Northern Central. When she was condemned her boiler was all right, but her working gear was loose, and made as much noise, when in motion, as a dozen threshing machines. The old humpback could pull or push a very long train, but had no speed. In trying to make a flying switch she did not get out of the way in time, and was severely bumped, and being too old to be resuscitated, was condemned to be dissected for the scrap heap.

THE Eames Vacuum Brake Co. have issued a finely illustrated descriptive circular, in which it is said that within the past three years the brake has been applied to 490 locomotives, 2,050 cars, upon 67 different roads and in 9 different countries. Reference is also made to the fact that over 200 engines and 500 cars are equipped with it on the elevated railroads of New York City. The number of stops made by trains on these roads since the brake was first applied to them is estimated at twenty-five millions. This, if it is even approximately true, is a pretty good record for the device, in the absence of any evidence that a single accident has been caused by its failure to work.

SOME fast running was recently made on the Lake Shore road, when the Vanderbilt party was pulled 183 miles in 222 minutes, 95 miles being run in 106 minutes with three stops, and 17 miles in 16 minutes. A day or two afterwards, engine "168" of that road, run with six cars from Erie to Buffalo, a distance of 88 miles, in 116 minutes, including four stops. Her drivers are 5 ft. 6 in. Engine "171", with 5 ft. 10 in. drivers, also made the run from Erie to Cleveland, a distance of 95 miles, in 106 minutes, stopping five times.

THE Brooks Locomotive Works, at Dunkirk, N. Y., are building four mogul engines weighing 41 tons, and four six-wheel driver switching engines, weighing 35 tons each, for the Cin., Ind., St. Louis & Chicago road. The four Forney locomotives built for the Cleveland & Tuscarawas Valley are not only working well, but are proving very economical engines for light passenger train service.

A THIRD track is to be laid on the New York Central between Rochester and Buffalo. There is already such a track for various distances along the line, but the actual new track to be laid will be 95 miles. The contract provides for the completion of the work by the 15th of August. About 9,500 tons of steel rails will be required, which have been purchased in London and have already been shipped. The entire cost will be from $250,000 to $300,000.

THE Bass Foundry & Machine Works at Fort Wayne, Ind., employ 600 men. About 60 tons of metal are melted per day for ordinary castings, mostly for railroad use, and about 90 tons per day for car wheels. A new two-story machine shop, 70 × 230, is being erected. The old one will be converted into a hammer shop for the manufacture of car axles and general railroad castings.

MESSRS. BRADLEY & CO., of Syracuse, N. Y., have appointed H. G. Wormer & Co., 807 North Second street, St. Louis, Mo., and T. S. & A. J. Kirkwood, 171 Lake street, Chicago, sole agents in their respective cities for the sale of Bradley's Cushioned Hammers at lowest factory prices.

THE MCCASKEY CAR WHEEL CO. has just been organized at New Castle, Pa. It will manufacture a special wheel recently patented by Mr. John McCaskey, of that place, and which is said to combine the good points of the Allen paper wheel with those of the ordinary cast-iron wheel.

THE Jackson & Sharp Co., of Wilmington, Del., are building a number of Wagner sleeping cars. Two of them, the "Canajoharie" and "Canonicus" have been completed, two more are in process of construction, and five additional ones are yet to be built.

THE shops of the Pittsburg, Cincinnati & St. Louis road, at Logansport, Ind., now employing some 400 men, are inadequate to the needs of the road, and are to be enlarged at once.

THE Gilbert Car Works, Buffalo, N. Y., have orders in hand for 300 gondolas of 20-tons capacity, 25 box cars for Bradford, Bordell & Kinzua, 200 flats for New York, Ontario & Western, and 100 refrigerator cars.

"PAN HANDLE" engine No. 22 recently pulled a train from Columbus to Denison, running one mile in 45 seconds, and 19 consecutive miles in 16 minutes. This was fast; but, by the way, what was the size of the train?

THE shops of the Michigan Central road, at Jackson, Mich., are full of work, and employ 476 men. Six new engines are soon to be built, and 13 are being reconstructed.

AT the Meadville shops of the New York, Penn. & Ohio 65 locomotives have within the past few months been changed from the 6 feet to standard gauge.

ALL first-class passenger cars of the New York Central & Hudson River road are now equipped with the Westinghouse automatic brakes.

MR. C. R. MORRIS, the master mechanic of the Wabash, St. Louis & Pacific, at Fort Wayne, is building a new fast runinng passenger engine.

A Model Street Car.

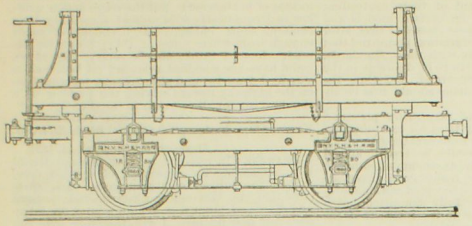
The Philadelphia *Record* has the following description of a new street car that has just been introduced into that city:

"Perfect ventilation has been secured by a perforated ceiling. The dome lamp in the center and side lights add increased brilliancy to the interior, besides dispensing with the obnoxious smell of oil. The windows are quite large, and besides having a patent anti-rattling attachment, are so arranged that, when desired, they can be opened to an extent that makes practically an open summer car. The platforms are made very low purposely to accommodate children and ladies. The conductor can be signaled by the passenger without rising from his seat. Above the driver's head, suspended by pivots to the roof, is a mirror set at an angle, giving him a full view of the interior. The conductor is also provided with a mirror, enabling him, by standing with his back to the door, to keep a lookout for passengers in and out of the car. Each car has a contrivance entirely novel for preventing accidents to horses which might fall down and be exposed otherwise to injury by being dragged beneath the car. Another arrangement in front of the fore wheels is designed to save human life. A further device relieves the horses from all strain in starting and, above all, the springs and springbed are of a new pattern, permitting the car to turn curves as on a pivot, without a jar or noise."

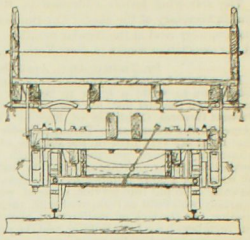
As to train 6, says the Youngstown *News*, its speed is wonderful. The paddle-wheels of the engine (No. 25) began to revolve, and the train started after them. Directly we left the Lake Shore depot it began speeding. Before we reached Struthers the conductor said we were making two miles in two minutes, and that below the next station we would double that speed and make one mile in one minute. The passengers held a convention and passed resolutions to request that the coaches should not be allowed to get ahead of the locomotive, as we feared that would make confusion on board. As we left Struthers, the train began to hum like a mum social, and the flies were hurled against the rear windows with terrible force. When the whistle was sounded for a station, the sound seemed to be half a mile in the rear.

STANDARD DUMP CAR—NEW YORK, NEW HAVEN & HARTFORD RAILROAD.

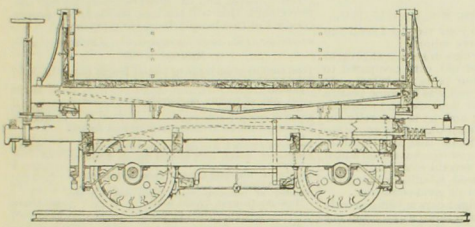
Built at Hartford Shops: L. Packard, M. C. B.



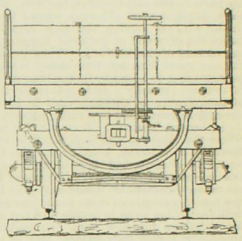
Side Elevation.



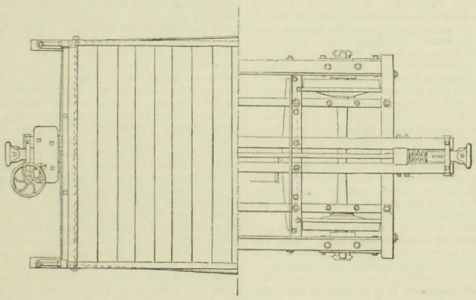
Transverse Section.



Longitudinal Section.



End Elevation.



Floor and Floor Frame.

GENERAL DIMENSIONS.

Length over all	15 ft. 0 in.
Length of body	12 " 6 "
Width of body	8 " 0 "

BODY TIMBERS.

Side sills	white oak.	4½ x 8 in. x	12 ft. 0 in.
Intermediates	"	4 x 7½ " x	12 " 0 "
Rocker plank	"	3½ x 8½ " x	8 " 2 "
End sills	"	5 x 8 " x	7 " 6 "
Side swing plank.	spruce.	2 x 22 " x	12 " 3 "
End plank	"	2 x 22 " x	8 " 0 "
Floor	So. pine.	1¾ in. thick, 8 feet long, matched.	

TRUCKS.

Draught timbers.	white oak.	5 x 9½ in. x	15 ft. 9 in.
Wheel piece	"	5½ x 8½ " x	10 " 8 "
Safety beams	"	4 x 6¼ " x	11 " 0 "
End sills	"	5½ x 8½ " x	7 " 6 "
Intermediate cross timbers	"	4½ x 8½ " x	6 " 10 "
Brake beams	"	4½ x 6½ " x	5 " 6 "

Average weight of car	10,000 lbs.
Coal-carrying capacity	15,000 "
Sand-carrying capacity	22,000 "

Axles same size as those used under box cars. Journals, 3¼ x 7: continuous draw-bar, wrought-iron rocker-beds, and self-adjusting body fasteners.

Association of Railway Superintendents.

The following address was drawn up at a meeting of railroad superintendents, held at the Windsor Hotel, New York City, May 11, with the request that it be published in papers devoted to railroad interests:

To the Superintendents of American Railways:

Your interest and aid in an attempt to organize an Association of Railroad Superintendents are earnestly and respectfully invoked. We need not expatiate upon the need of such an organization. It is in the nature of our calling to speak emphatically, briefly and pointedly upon professional matters, and those whom we address will more readily listen when we so speak. It seems to us that an association for the interchange of views regarding railroad practice is eminently desirable. We think it remarkable that, while master mechanics, road masters, ticket agents, train officers and other subordinates have associated themselves and are receiving the benefit arising from the exchange of the fruits of knowledge and experience, the superintendents of the railroads, to whom so much is intrusted, have, so far, stood aloof and made no effort to intermingle. We ask that those of our professional brethren who think with us and will join us, will forward their names for enrollment to the chairman or secretary of this meeting.

The address is signed by the following superintendents: Waterman Stone, Providence, Warren & Bristol; L. W. Sandiforth, Danbury & Norwalk; C. D. Hammond, Delaware & Hudson Canal; L. W. Palmer, New York & New England; J. F. Divine, Wilmington & Weldon; and E. T. D. Myers, Richmond, Fredericksburg & Potomac.

The meeting adjourned, to meet at the same place on the third Wednesday in September.

IT is said that locomotive "396" is regarded as the Jonah of the engines on the New York Central, for the reason that it has figured prominently in more smash-ups and accidents, and has killed and discharged more men than any other engine on the line. The late engineer, John Kinney, and his fireman were killed on this engine at Clyde, October 3, 1877, and another engineer, while running her, fell asleep and ran into the rear end of a train at Byron. The entire crew was discharged. Many other accidents in which she played a prominent part are known.

THE Hinkley Locomotive Works, Boston, are building ten locomotives for the Missouri & Pacific. They have four driving wheels on each side, and will be considerably heavier as well as more powerful than ordinary engines. Their style is almost perfectly plain, many parts usually polished in this case being painted black. They will weigh, when completed, about fifty tons each. A peculiarity of their construction is, that the engineer's cab is practically over the boiler or fire-box, while the fireman is placed behind and beneath. This concern is also building eight for the New York & New England railroad of about the same weight and the same number of driving wheels, but otherwise different.

General Condition of Freight Cars Interchanged in Through Traffic.

The following letters, addressed to Mr. C. A. Smith, Secretary of the Master Car-Builders' Association, were read at the regular monthly meeting at the association rooms in New York, April 21:

ST. THOMAS, Ont., April 18, 1881.

DEAR SIR: In reply to your letter of the 2d inst. asking me to write a letter to be read at your meeting on the 21st inst., on the subject of "The Present General Condition of Freight Cars Employed in the Interchange Through Traffic," I fear that I can say very little on the subject, of a complimentary nature generally, although in some respects an apparent improvement is discernable by reason of a large number of new cars having recently been put into service, some of which are tolerably well built as compared with their predecessors; but the lack of uniformity, about which our members have been talking, and the press have been commenting on for years past, is as noticeable now as ever. The running and draft gearings in the cars of one builder do not correspond with similar parts in the cars of other builders, neither are they duplicates of old cars owned by the companies who are having the new cars built, and hence the diversity of patterns keeps on increasing instead of diminishing. This, to my mind, is the one great blunder that many companies are perpetuating at a cost to themselves of thousands of dollars annually; and, wherever the system of interchange of through cars is in operation, the evil is intensified in a ratio proportionate with their through business. It is not for me to say where the blame should rest for this creation of diversity of patterns, whether on the builders or on the purchasers; but there is one thing certain in this connection, and that is, if some of the principal railroad companies would only give the matter due consideration, and come to a fair understanding with each other so as to decide on fixed models and specifications for new cars, the builders would necessarily follow instructions, and in the course of a very short period a general style would be adopted; and then as old cars required repairs, alterations of old to new patterns could be effected with but very little additional cost. With the body of a car differences in construction are of very little consequence, as in cases of repairs to wood work the material has almost invariably to be cut and shaped to suit; but in the trucks and draft attachments, which, from the very nature of their duties, are more or less constantly needing repairs of one kind or another, there should not be a tittle of difference in their make which would prevent similar parts of a standard character from being used as substitutes in cases of renewals.

The Master Car-Builders' standard axle is, I am glad to see, becoming a standard in reality, but the journal-box and bearing is as far from being a standard as ever, although one is supposed to exist, and, to the credit of a few roads be it said, one does exist. To those few who have adopted the standards that have been approved of at our meetings, it is very discouraging to find so many who are not only not trying to work in these standards, but apparently are doing their best to oppose them by altering their leading features. Let us take a journal-box as an illustration. In the standard box for diamond-bar trucks, the centers of holes for the arch-bar bolts are 8 in. apart; but many of the new cars have them only 7 or 7½ in. The height of box to pit between the bars is 9⅛ in.; but many are only 8 or 8¼ in. The width inside in the clear where the bearing fits should be 4 11-16 in., but some are smaller and some larger; and then the shapes of the bearing and key are even more various, which utterly destroy any pretension to uniformity. The same incongruity exists in the draw-bar and brake attachments, the result of which necessitates keeping in stock an enormous quantity of material which, under even an approximate system of uniformity, could be reduced to at least one-fourth what it is at present, making a reduction in the value of material generally kept in stock equal to at least 75 per cent. As an instance of the number of patterns that some roads have to keep to meet their requirements, due to the interchanging of cars, it is not a month since I was informed by the Master Car-Builder of one of our Western connecting roads that he had 60 different patterns of journal-boxes, and was then having one or two more made to suit foreign-road cars. I have no doubt that other roads can confirm and supplement that assertion in the matter of other castings, and while the necessity for such a state of things exists, surely it cannot be said that "the present general condition of freight cars in the interchange through traffic" is by any means satisfactory.

There appears to me only one way of remedying the evil, and that is, as before suggested, for some of the principal roads to make a starting point, and by general agreement of their controlling managements determine on certain models and specifications for the various classes of cars, after which there should be no variation permitted that would in any way interfere with these standards, unless it could first be shown to be desirable in the interests of the roads concerned, and then the consent of subscribing parties should first be obtained.

This restriction will not necessarily prevent a good invention from being tried for test purposes, as on all roads there are local cars used on which so-called improvements could be tested, and if found worthy of adoption, as conducing either to economy or safety, any really good invention would, in all probability, be accepted as a standard. These remarks are respectfully submitted, not in any spirit of dictation, but in the interests of the Master Car-Builders' Association.

Believe me yours respectfully,

JOHN ORTTON,
Canada Southern Railway.

ST JOSEPH, MO., April 15, 1881.

DEAR SIR: Agreeable to your request I send you a few thoughts on the above subject.

First. As to age of the cars in service at present time. The percentage of old cars compared to what it was three or four years ago is low. At that time there had been and was for some years a very serious depression of business, and railroads had to curtail expenses; and as is generally the case the car department felt it more than any other branch of the service. Since that time business has revived, thousands of new cars have been added to the equipment of the several roads, and thousands of old cars have been rebuilt, bringing the average from poor or fair to a good condition.

The present style of freight cars is being greatly improved. A few years ago there was a great cry for a lighter car—one that would increase the paying weight and reduce the dead weight, the demand no doubt being brought on by the advocates of narrow-gauge railroads. In response to this demand there was a class of cars built for which I can find no better name than cobble houses, that amounted to so much kindling wood when, by chance, any of them got into a wreck; or, at best, a source of expense to the companies owning them to keep them in repair. Since that time "a change has come o'er the spirit of their dream" for the better, and stronger and heavier cars are being built—cars that do not break by fair usage, cars that instead of carrying 10 tons carry 20 tons. Another style of car that is going out of use is the combination car, a car which has been another endless source of expense to keep up, and one which has been very unsatisfactory to shippers of either stock or merchandise. Every master car-builder will rejoice that each car is now built for the peculiar service for which it is intended.

A word about what is known as line cars perhaps would not be inappropriate here. I do not think, with one or two exceptions, that they have made the same advances in style and strength as other freight cars, neither have those companies whose peculiar province it is to lease or loan cars to railroad companies; but I think from the way matters are tending that both transportation line cars and cars leased will in a few years become a thing of the past.

Now as to the general condition of freight cars at the present time. No one will deny that they are in better shape and condition than at any period in the past history of railroads. There are very few cars rejected on account of general debility. The roofs are better, brake-staffs, running boards and ladders receive more attention, the average of wheels are much better—all owing in a great measure to the agitation of the above questions in the Master Car-Builders' conventions.

The trucks are better, but we have not reached the millennium; when each road will run the Master Car-Builders' standard axle, if it could be done, and one other thing, namely, a standard draw-bar and attachments, there would be little trouble in the interchange of cars. Let me write down "*draw-bars*" in italics. If there is one thing more than another that puts a master builder out of humor it is the thousand and one different devices of draw-bars that are in existence. I do not include those in the patent office, "from which deliver us." Now it seems that the draw-bar is to the average master car-builder a great deal like the smoke-stack of a locomotive to the average master-mechanic. It is his hobby to have his own peculiar smoke-stack on his own engines; something that is ahead of anything else in that line, and the master car-builder has a draw-bar that is ahead of the rest of the roads about him, which he will demonstrate to his own satisfaction at least, if not to that of his listener. But the result is that a fellow is driven nearly wild to find something long enough, short enough, large enough or small enough to do when some of them break on his road. Now, I think, Mr. Secretary, that if we could have the standard axle and oil box, and a standard draw-bar and attachments, we would be on the highway toward solving the problem of a standard car for all railroads in the country.

THOS. AYLESBURY,
Kansas City, St. Joseph & Council Bluffs Railroad.

DETROIT, Mich., April 14, 1881.

DEAR SIR: In response to your favor of the 2d inst., requesting an expression of opinion from me on the subject of "interchange cars," their condition, etc., this topic has been so often "cussed and discussed" that it is a hard matter to introduce any new feature. I will, therefore, give you briefly the experience of this road (Michigan Central) in handling foreign cars during the year 1880, which will serve to show the magnitude of the interest involved and the great necessity for any improvements that will tend to facilitate the proper conduct of this largely increasing business.

Statistical items relating to foreign cars on Michigan Central Railroad in 1880.

Total number of miles run by foreign freight cars	61,458,277
Total number of foreign cars in use on Michigan Central	58,692
Total cost of repairs on foreign cars in use on Michigan Central	$77,900.40
Equal to cost per mile run	125-1000 ct.
Number of wheels removed from foreign freight cars	1,440
Number of hook boxes on foreign freight cars	22,546
Number of foreign cars broken up on Michigan Central	7
Number of Michigan Central cars broken up on foreign roads	20
Number of common grain doors used on the Michigan Central, 75,206; cost	$18,690.00
Number of links, 29,758; pins, 23,545; cost	$19,652.58

From these figures can be seen how large an expenditure is necessary to maintain foreign freight cars on roads forming part of the through lines, being about 22 per cent. of the total cost of car repairs on this road. If our cars are maintained by us in good condition and their mileage less (which is the case) on other roads, we have not sufficient to offset this large expense. In view of the loads now carried in merchandise cars, and the increasing interchange; it seems to me an imperative necessity to insist on the following requirements for all cars offered for through business in addition to present rules: *First*, all through cars must have Master Car-Builders' standard axle, with journal 3¾×7 in.; *second*, wheels must all be 33 in. diameter, standard gauge; *third*, loading capacity must in all cases be marked on both sides of car, together with the weight of car when built. If cars break down under the load designated, owners shall be held responsible for consequent repairs on such cars; *fourth*, all grain-carrying cars must be provided with permanent grain doors; *fifth*, every effort should be made to do away with wrought-iron draw-bars, and, if possible, establish a standard for a cast-iron one; *sixth*, the strength of links and pins should be increased to meet the additional loading; *seventh*, uniformity should be established in the use of lubricators on through cars; *eighth*, cars not owned by railroad companies should not have the benefit of interchange rules, but should be received and run at owner's risk, giving them ordinary care, and charging them with all repairs made, as it is not just that railroad companies should maintain such cars in good condition at their own expense, as is now done; *ninth*, a code of rules should be established governing the interchange of passenger equipment, which is not now subject to freight rules, and requires some modification therefrom; *tenth*, all roads damaging foreign cars should repair them promptly. If detained over ten days waiting such repairs, demurrage charges should be collected.

I think the foregoing will do for the present. In general, I would say that the condition of freight cars has been very sensibly improved during the past two years. The adoption of some such rulings as I have suggested will tend to make them still better.

We do not get sufficient service out of our cars; they will not average on roads generally over 1,000 miles per month for each car. This mileage should at least be trebled, and thus reduce the number of cars required to transact the same amount of business. Yours respectfully,

ROBT. MILLER,
Michigan Central Railroad.

AURORA, Ind., April 8, 1881.

DEAR SIR: Your favor of April 2 duly received and noted, stating that discussion at monthly meeting in April would be the present general condition of freight cars employed in the interchange through traffic. It is certainly a very interesting subject, and one in which every master car-builder is deeply interested, and one on which there could be a great deal said. But I suppose what you want is statements backed up by statistics or some proof, and not merely an assertion made that such and such is the case when there is no better authority than the word of the person making the assertion.

I am only prepared to make a statement without any figures to support it. I can say that my observation has been that the general condition of freight cars is far superior to what it was two or three years ago. There are cars belonging to a large number of different companies running over the Ohio & Mississippi road daily. From two to five years ago it was a very common thing to have bills sent for approval for damaged freight. These bills always give the number and initials of the car in which the freight was damaged. From these bills I learned that freight was damaged in cars belonging to different companies, but invariably the damage was caused by leaky roofs. I have no recollection of signing any bills of this character for the last two years. This fact convinces me that there has been an improvement in the condition of car roofs at least inside of the last two years. While perfection has not yet been attained, I have noticed a vast improvement in the drawing attachments that make it more safe for trainmen and switchmen. The old and never-to-be-forgotten "man-killer" has almost entirely disappeared. The draw-bars are almost universally of a uniform height, while many roads have adopted automatic couplings which almost entirely do away with the danger incident to making up trains. The automatic freight train brake is being experimented with to an extent far beyond the expectations of those who first suggested that such a thing might be invented, and the time is not far distant when a railroad company which has not got their freight cars equipped with an automatic freight train brake will be regarded as a one-horse concern.

The Master Car-Builders' standard axle is being adopted by a number of roads, and when the car-builders can decide on a standard oil-box and journal-bearing, which they will no doubt do in the near future, it will be another step in the right direction.

The bodies of freight cars generally are in better condition than they were two years ago. There has been an unusual amount of work done in contract shops in the last year, and the railroad companies have been rebuilding and repairing their cars, beside buying large numbers of new cars, so that freight cars generally do not show the age that was observable previous to the last twelve months. The subject of wheels is a rather perplexing one, and although I know that I will meet with opposition, I will give it as my opinion that the rule governing the condition of wheels should be either entirely done away with or changed so that wheels as well as other parts of a car should be made good at the expense of the company in whose hands the car is when the wheels are worn out. If a wheel is found upon examination to be so near worn out that it will not make a trip or a round trip over the road to whom it is offered, let it be rejected. There is no class of bills with which I have so much trouble to intelligently certify to as those rendered against us for wheels. This, in my opinion, is really the true way to do business, putting as it does the wheels on the same basis as the rest of the car, and would undoubtedly save a great deal of trouble in the course of a year. Hoping you may have a profitable meeting, I am sir, yours respectfully,

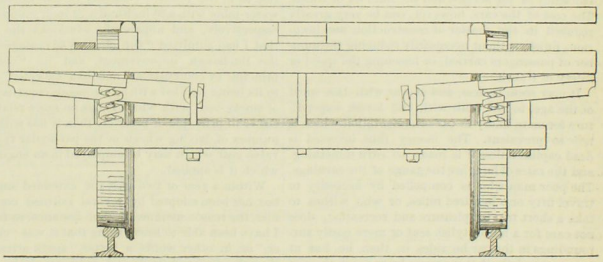
J. P. COULTER,
Ohio & Mississippi Railway.

The Cattle Car Prize.

During a recent visit to Chicago we saw the collection of models of cars and plans of cars which have been sent to Mr. Brown as chairman of the judges. There are 480 of the former and 243 of the latter. A careful description of each is being prepared for the use of the judges. It will be apparent at a glance that this must be done in justice to each competitor, and also that careful work and much time are required for it. This explains the delay; a delay that must be protracted for some time longer. Then in several manuscript volumes are copies of every patent issued so far by our Patent Office for an improved cattle car, numbering now 116; the first in time bearing date in West Virginia, May 29, 1860. It will require much careful consideration to determine how many of the new plans were already protected by one or other of these numerous patents.

We were curious to know whence the competitors came. Nearly every State is represented, and also England, Switzerland, and, of course, Canada. Illinois has 51 models and 18 plans, being the highest numbers from any one State: Pennsylvania is second, with 47 models and 27 plans; New York is third, with 43 models and 15 plans; Ohio is fourth, with 37 models and 18 plans; Indiana is fifth, with 21 models and 13 plans; Massachusetts is sixth, with 19 models and 26 plans; Michigan is seventh, Iowa is eighth, Missouri is ninth and Minnesota is tenth. Among the competitors are eight women, from the same number of States. Some competitors have more than one model and others more than one plan.

The collection represents a great amount of thought and labor and ingenuity, as well as skilled workmanship. That a better car will be the result no one doubts who has full information on the subject. There are cars which came into existence in consequence of the offer of the prize which are not there, because their inventors think them too valuable to part with for the prize; but their points will be known to the judges, and they are, of course, a part of the valuable results already secured by the offer.—*Scientific American.*



FREIGHT TRUCK SPRING EQUALIZER.

THE engraving illustrates a device (as applied to a freight car diamond truck) for equalizing the pressure on the springs, so the car body may ride as easily on them when it is empty as when it is loaded, and vice versa.

It is well known that a great number of cars, especially on east and west lines, run heavily loaded in one direction, and nearly or quite empty in the other. The springs are designed to carry a load of from 15 to 20 tons; but when the car is empty the weight of the body is not sufficient to compress the springs, and it rides very much as if there were no springs at all.

It will be seen by the drawing that the empty car does not ride directly on the springs, as it must necessarily do in the absence of the device shown, but by the medium of the levers the pressure on the springs is so much increased that the car body gets the benefit of their action the same as if it were loaded. The leverage is gradually taken up, however, as the car is loaded, until, when fully loaded, the weight rests upon the springs themselves, the operation of the device being to equalize or adjust the springs to the load, irrespective of weight, be it more or less, and thus prevent the wear and tear incident to the hard riding of empty freight cars.

A practical trial of it has been made on the Old Colony road. The inventor and patentee is Mr. J. A. Tilden, South Boston, Mass. Messrs. Hersey Brothers, of same place, may be addressed for further information.

The Continental Railway.

This project, as set forth in a pamphlet that has just been issued, consists of the proposed construction of a continuous double-track railway from New York City to a point on the Missouri River near Council Bluffs, the main line passing through New Jersey, Pennsylvania, Ohio, Indiana, Illinois and Iowa, thus affording a more direct outlet than now exists for the products of the west, northwest, and southwest, to eastern markets; and also furnishing transportation for a heavy westward-bound coal traffic in the future. The special advantages of the line are stated as follows:

Time freight trains will be run at the rate of 20 miles an hour. Live stock will be delivered at eastern markets in good condition, at low rates, and in quick time. Limited express passenger trains will be run between New York and Chicago within 24 hours, and at rates not exceeding ten cents a mile, and the distance between the two cities will be reduced to 780 miles or less—from New York to St. Louis to 960 miles, and to Omaha not over 1,200 miles. The grades, coming east, will in no case exceed ¾ of 1 per cent and will be proportionately light going west. At convenient points along the line three and four tracks will be laid for eight or ten miles, for the purpose of passing large fleets of freight trains out of the way of passenger trains. All bridges will be of a strength sufficient to sustain a maximum load crossing at a high rate of speed, with not less than six-fold of safety. All tunnels will be lined, and every precaution will be taken to insure safety to persons and property. The road will be ballasted with broken rock, 18 inches in depth. The rails now being made for the road are specially designed to sustain its heavy traffic. The equipment will be of the highest order, and is now being constructed from plans and specifications specially prepared.

It is stated that the company is a consolidated corporation, deriving its powers from each and all of the States above named, but the names of the officers or corporators do not appear. The maximum traffic capacity of the road will be, according to estimate, about 100 freight trains of 40 cars each per day each way, which will render it practicable to reduce the tariff on grain and meat products from the west to about five mills per ton per mile.

Communications.

Class Cars and Passenger Traffic.

To the Editor of the National Car-Builder:

That railroad passenger traffic is not more remunerative than it now is, as compared with freight earnings, suggests the inquiry whether there is not something wrong in the way in which it is now conducted. In order to increase the earnings, a greater number of people must be induced to travel at present rates of fare; or, if this is not practicable, the question arises whether a much greater proportionate amount of travel might not be drawn out by an adjustment of rates upon a lower scale of prices. The increase of the passenger mileage of railroads has not kept pace with the increase of population, and one of the reasons for this the writer has pointed out in a previous article, in which reference was made to the great change which has taken place in the methods of transacting business between city and country dealers. This, however, is only a partial solution of the problem. The question still remains, Why do not the great mass of people, and especially those with small incomes, travel more than they do? The reply must be that they can't afford it; and therefore they do not indulge in it unless compelled by circumstances more or less pressing and urgent. The next question is, How can the actual cost of passenger transportation be reduced to meet the wants of this class of people, and at the same time leave a fair margin of profit to the roads? The current running expenses, it must be admitted, cannot be much reduced below what they now are, and at the same time maintain the efficiency of the service and the number of trains. The cost of the cars, however, can be very greatly reduced in the matter of construction and luxurious finish, without necessarily reducing the number of passengers carried, or lessening the speed or safety of transit.

It may seem useless, and at war with the spirit of the age, to find fault with the lavish expenditure for mere finery in car ornamentation which is now so prevalent. The money thus invested is dead capital unless it is made to earn something, and the rates of fares are the gauge of the earnings. The poor man who is compelled by necessity to travel fifty or a hundred miles, or who wishes to take a short trip for pleasure and recreation, does not care for a more stylish seat or more costly surroundings in the car he rides in than he has at home, especially if it increases by so much the cost of his journey. Yet, as things now are, he must pay for this or not go at all. There is no intermediate place for him between the emigrant car and the finely equipped "coach," and emigrant cars run in special trains that are not available for regular local traffic. In the absence of class cars of a grade inferior to the ordinary day coaches, there is no provision for the class of people referred to, and who would make perhaps twenty trips a year at low fares, while they now only make two or three at the prevailing rates. The argument against class cars on the score of democratic equality has no weight with me. It is deceptive, misleading and fallacious. There never was, and never will be, a political community that is not made up of classes—the rich and the poor, the learned and the ignorant, the base and the honored. And not only so, but the relations of individuals and classes are constantly changing. The child rocked in a hundred-dollar cradle may grow to manhood and be buried in a five-dollar coffin, while, conversely, the man who was cradled in a dug-out may have a funeral a mile long, and forty tons of monument erected over him in a fashionable cemetery. Let the cars be classified, with rates of fare to correspond, and the people can then classify themselves when they travel, just as they do now as between drawing-room cars and ordinary coaches, a classification with respect to cars which is already established among us, one class being intended for the rich and the other for the comparatively poor. And now we want another class for those who are poorer still, and whose money, so far as it goes, is every whit as good as that of a millionaire. We have plenty of third-class houses, hotels, churches, theaters, steamers, and what not, and there is no hue-and-cry raised against them. This squeamishness about third-class cars must sooner or later yield to public convenience. So far as the roads are concerned, it is not a sentimental matter, but a practical question of dollars and cents, which the great traveling public will before long begin to see in its proper light.

The further introduction of class distinctions in cars is of course only a single phase of the problem. When viewed in all its bearings, it is an exceedingly intricate one. Persons do not admit of being discriminated and classified like freight, the well-to-do ticketed the same distance in the same cars at a high tariff, and the indigent at a correspondingly low figure; nor is it possible to carry passengers in proportion to the dead weight of the cars, upon the basis of ton for ton, as is the case with freight.

H. C. W.

The Extended Locomotive Smoke-Box.

To the Editor of the National Car-Builder:

The reply of your correspondent "S," in your issue for May, to my communication relative to performance of the engine "Altair," of the New York, New Haven & Hartford R. R., begs the question as to the relative economy of the Buchanan water-table with a 30-inch and a 72-inch smoke-box respectively, and apparently overlooks the fact that I had admitted "the obvious advantages" of the Buchanan improvement, and its "correct principle of combustion," and had excepted only to its being saddled with an erroneous construction of smoke-box, with which it has no more relation, either in principle or practice, than it has with the number of driving wheels or the particular type of valve gear which may be employed in an engine to which it is applied.

Within a year or two past the extended smoke-box has been adopted by several railroad companies, the reason assigned in each instance, so far as I have been able to learn, being that it was "cleaner," or, in other words, a better "spark arrester" than the diamond stack and ordinary smoke-box. This being merely a matter of assertion and denial, I shall not trespass upon your space with a discussion of it; but, inasmuch as "S" comes to the front with the startling assertion that the extended smoke-box is a *fuel economizer*, I trust you will permit me to present my views in the matter, in the hope of eliciting a reason for the faith that is in him, and of developing, in the interest of railroad improvement, that which I have, as yet, failed to meet with, namely, an intelligent presentation of the alleged advantages of this device on the part of those who are advocating its introduction.

The relation of cause and effect obviously exists as fully in a locomotive engine as in any other structure, and if any useful or beneficial result is derived from increasing the volume of a locomotive smoke-box to the extent of 150 per cent. or thereabouts, above the ordinary limit, such results must certainly be due to some ruling cause or natural law, which is or ought to be known to, and susceptible of explanation by, those who maintain that the effect exists. The two separate results claimed for the extended smoke-box are: (*a*) effectiveness as a spark arrester, and (*b*) superiority as a "fuel economizer," the principle of action as to the supposed attainment of the first being apparent from the structure; but that of the second in no wise appearing, and, on the other hand, being in direct opposition to both theory and practice under the conditions which necessarily obtain in the endeavor to effect the first.

The extended smoke-box was first proposed by one John Thompson, of Boston, Mass., who took a patent for it May 29, 1860, No. 28,520, his claim being: "The improved smoke-box as so extended beyond the smoke current leading from the pipe-stack to the chimney, that the sparks or cinders discharged through the pipe-stack may pass out of and beyond the current of smoke, *so as to be deposited in the box by the action of gravity, and not be carried up the chimney.*" Thompson's claim, which looks feasible enough to any one who does not know the strength of an exhaust blast, tells the whole story as to the *rationale* of the extended smoke-box. He did not attempt to claim that his extended box effected any economy of fuel, and it is idle to maintain that the extension is anything more or less than a receptacle for sparks, cinders, and unburnt fuel, interposed between the front ends of the tubes and the lower opening of the stack, or that it can or does in any wise act to *reduce* the consumption of fuel or the quantity of cinders and unburnt fuel drawn through the tubes by the exhaust.

The fact that Mr. Buchanan sees fit, doubtless for good and sufficient reasons, to permit his improvements to be used in connection with an extended smoke-box, does not prove any superiority of the latter, either as a spark arrester or a fuel economizer; nor is it any evidence that his improvements would not be of still greater efficiency when used with a smoke-box of normal dimensions. If, as Mr. Buchanan claims, and as the writer believes, his improvements effect an economy of fuel, it is because he perfects combustion in the fire-box and combustion-chamber, and correspondingly reduces the escape of solid matters from the fire-box, and, just in proportion as he succeeds in this, does he do away with the necessity and usefulness of an enlarged spark and cinder receptacle?

The "adjustable serrated diaphragm" upon which "S" lays considerable stress, is *not*, as stated by him, contained in the extension of the smoke-box, but is located a short distance in advance of the flue-head, in that portion of the smoke-box which corresponds to the ordinary construction; and this device is not only wholly separate and distinct in principle and function from the extended smoke-box, but is described and shown by its inventor, Henry I. Hoyt, in his patent, No. 222,631, of April 6, 1880, as applied in an *ordinary* smoke-box, and as designed to do away with certain objectionable necessities which attend the employment of the extension, the diaphragm, as he states, "obviating the necessity of *carrying an accumulated body of cinder in the smoke-box, and rendering the frequent sparking of the boiler unnecessary.*"

Thompson's extended smoke-box, as originally patented by him, had no netting or deflector to prevent the escape of sparks and cinders, and as a matter of course, was therefore impracticable. Hovey's subsequent arrangement with netting proved a complete failure, and it was not until a deflector or diaphragm was placed in front of the flue-head that the extended smoke-box began to be even endurable. This deflector was patented, *in an ordinary smoke-box*, by R. Hill, June 23, 1874, No. 152,375. An improvement upon it, consisting of the addition of an adjustable section, operated from the cab of the engine, constituting "an adjustable check diaphragm" was patented, among other devices, by William Buchanan, John M. Toucey, and Henry I. Hoyt, Feb. 17, 1880, No. 224,640. This improvement was likewise described and shown *in an ordinary smoke-box*, and no reference whatever was made to an extension.

Finally, Henry I. Hoyt patented, as before stated, the *serrated* diaphragm, also in an *ordinary* smoke-box, referring to the adjustable diaphragm of Buchanan, Toucey and Hoyt, as one of the "devices by which what is technically termed 'drawing the fire,' is much reduced, and consequently *only a small quantity of small sized cinder drawn from the fire bed by the action of the exhaust.*"

I have made the above citations to show that the inventors of the plain, the adjustable, and the serrated diaphragms, have themselves indicated that those devices have no connection with the extended smoke-box, and the same is the case as to the original Buchanan and Toucey water-table patent of 1867. I maintain, further, that the extended smoke-box was proposed and has been employed as a spark arrester, and for no other purpose; that it is a physical impossibility for it to exert any effect upon combustion other than an injurious one due to its improper excess of volume; and that the allegation of its *usefulness* in connection with the Buchanan or any other fire-box improvement, necessarily implies the failure of such improvement to fulfill its function by rendering the employment of a huge receptacle for sparks and cinders necessary or even admissible.

If your correspondent "S", or any other advocate of the extended smoke-box, will satisfactorily explain wherein it serves in the slightest degree as a "fuel economizer," or why it should be tacked to devices which, if performing the functions attributed to them would make it practically useless as a "spark arrester," he will throw a light upon the subject which will be of interest and value to those of your readers whose labors and studies are devoted to locomotive construction.

J. S. B.

The Fontaine Locomotive.

To the Editor of the National Car-Builder:

By your special request, I have much pleasure in sending you a few particulars relating to the construction and performances of the Fontaine locomotive, which, for several months past, has been running on the Canada Southern Railway. It has been taking the duties of our ordinary passenger engines, running on the arrangement of first in first out, without any picking or choosing either as to the trains or time of running them; and on all occasions it has done the duty in a first-class manner, and sustained a reputation as a fast runner and an economical consumer of fuel.

On one occasion recently, it showed its endurance qualification by taking a special train right through from Amherstburg to Buffalo, a distance of 235 miles, stopping here and there only a few minutes on account of crossings or to take water. The average time of running was at the rate of nearly 60 miles an hour, that limitation of speed having been fixed by special order previous to starting, otherwise the speed would have been much greater. At various points on the road, however, many consecutive miles were run in 54 and 55 seconds. During the entire run, the engine was notched up to give only 5 inches admission of steam, so that it can readily be conceived that both a heavier load and faster time could easily have been maintained. The weight of the cars was 66 tons.

When running at 60 miles an hour, the piston speed of the Fontaine is only 896 feet per minute, as compared with 1,223 feet for an ordinary engine with 5½-feet wheels, or 1,120 feet for 6-feet wheels. The speed of the machinery on the engine is, of course, correspondingly slow, which, together with the centre of gravity being much below the disturbing influence of the motion, tends to make the engine remarkably steady when running at high speeds. This is a matter of very great importance as a question of safety, irrespective of economy in the wear and tear of machinery.

Before seeing the Fontaine, and knowing nothing of it except by report, I confess that I felt somewhat prejudiced against it, because I thought that in the locomotive of the present day, perfection and simplicity were almost personified, and that it could not be improved by the running of one pair of wheels on the top of another; but after witnessing some of its remarkable performances, all doubt as to its capability for fast running disappeared; and on further investigating the principles of its construction, I am free to state that their conception, to my mind, is one of the grandest ideas in the way of improvement that has been put in practice since the establishment of the present orthodox locomotive; and I believe that the Fontaine is destined to be the pioneer of a type which will eventually be seen on all important railroads.

The motive power is concentrated and given out at a point where the greatest advantage is derived, and the application of its principles can be adapted equally well to coupled or to single pairs of drivers.

I understand that Mr. Fontaine is building another engine with exactly the same combination of wheels, which corresponds in the piston and wheel travel of an ordinary engine, with 7½-feet wheels; the boiler and cylinder capacities, however, will be enlarged. He also intends building another with smaller driving wheels, but with larger friction and rolling wheels, making their combination equivalent to an ordinary engine having 5½-feet drivers. It is to have two pairs of rolling wheels coupled, and to be adapted for hauling heavy fast freight trains.

The secret of the extra power gained in the Fontaine is in the judicious application of the driving-wheel force to the greater leverage obtained at the top of the friction wheel, as compared with the lesser leverage at the axle where the opposing force acts. These relative leverages are 63 inches and 35 inches respectively, which give 80 per cent. increase in favor of the longer length. There is, however, a considerable deduction to be allowed for, owing to the inclined position of the cylinders and motion work, and also for the extra friction necessarily involved in the mode of propelling the rolling wheels, but after making due allowance for them, there apparently remains fully 30 per cent. of the extra gained.

JOHN ORTTON.

ST. THOMAS, Ont., May 24, 1881.

Revision of the Rules Governing the Interchange of Freight Cars.

The following circular has been issued by the President of the Car-Builders' Association:

NEW YORK, May 23, 1881.

DEAR SIR: In compliance with the twenty-first section of the "rules governing the condition of and repairs to freight cars, for the interchange of traffic," and in response to requests made by the officers of a large number of railroad companies, I would beg to request the attendance of an authorized representative of your company at a meeting to be held at the Park Avenue Hotel, New York City, at 3 P. M., Wednesday, June 15, 1881, for the purpose of revising the rules above referred to.

It is earnestly desired that the rules shall be so revised and adopted at this meeting as to meet the necessities of all railroads offering cars for interchange.

This invitation has been extended to all the railroads in the United States and Canada.

Respectfully yours,

LEANDER GAREY,
Pres't Master Car-Builders' Association.

The *Railway Age* proposes that the inventors of car couplers have a convention at Chicago during the present year for the purpose of making a competitive trial of their respective devices. We second the motion, provided a corps or bench of competent and disinterested judges can be organized, whose decision will be accepted as final. This would put to rest one of the most perplexing problems of the age.

Cost of a Freight Box Car.

The following are the items of cost of a freight box car, 30 ft. long and 8 ft. 8 in. wide, as furnished us by a superintendent of the car department of a prominent road in one of the middle states:

ITEMS OF COST.

Castings	lbs.	1,106¼	.03	$31.87
Wrought iron	"	1,437		38.89
Brake chain	"	9¾		.22
Bolts	"	175½	.04	7 02
Nuts	"	58 11-16	.04	2.35
Atwood nuts	"	7 5-16	.05¼	.40
Washers	"	4 10-16	.04	.19
Sag screws	"	66		1.20
Royalty on draw-bars		2	.20	.40
Paint stock				5.30
Tin	sheets.	163	.08	13.04
Solder	lbs.	8	.11	.88
Tin nails	"	1		.10
Cleat nails	"	1		.10
40-penny nails	"	30	.03	.90
Steel nails	"	50	.04	2.00
2 Hubbard draw-bar springs		60	.06 8-10	4.08
Iron for door	lbs.	86		2 15
Iron bolts (40)	"	19	.04	.76
Carriage bolts	"	10	.01½	.24
Screws		44		.11
"		20		.09
Round iron staples		10		.02
Carriage bolts		4		.07
52 wrought washers	lbs.	2¾		.14
42 Clipped "	"	4		.20
8 Staples	"	1¾		.07
2 Hasps	"	1¼		.06
2 Eye bolts				.08
2 Door pins and chains				.10
Sag screws, ½ × 4 in		10		.05
6-penny steel nails		6		.30
Pine	ft.	770	28.00	21.56
Spruce	"	602	10.50	6.75
Hard pine	"	1,156	20.00	23.12
Oak	"	810	25.00	20.25
Pratt's door-hanger				5.92
4 Axles	lbs.	1,488	.03	44.64
8 Wheels			11.00	88.00
Castings	lbs.	1,945	.03	58.25
Journal-box covers, etc				1.14
8 Brasses	lbs.	78	.20	15.60
Wheel springs		8		20.40
Oak	ft.	138	.02½	3.45
Dust guards in journal-boxes		4		.06
Truck frames, etc	lbs.	1,205	.02 3-10	27.72
Wrought iron	"	446		11.20
4 Brake springs	"	141½	.05½	.80
4 Safety chains	"	6	.05	.30
Bolts	"	103¾	.4	4.16
Nuts	"	57⅛	.4	2.30
Atwood Nuts	"	7½	.5½	.41
Washers	"	5¼		.13
Carriage bolts		8		.20
Labor				41.70
Total cost of car				$511.64

RECAPITULATION.

Material in body	$190.08	
Labor in body	32.64	
Cost of body		223.62
Material in truck	$278.86	
Labor in truck	9.16	
Cost of truck		288.02
Total cost of car		$511.64

Reversible Sleeping Car Seats.

An exchange has the following description of the A. J. Smith reversible sleeping car seat, and says that Mr. Jay Gould favors its introduction upon his western roads:

"The principle adopted is the same as that employed in the ordinary iron car seat, occupying no more space than the common seat, and therefore can be introduced into old as well as new cars. The reversible upholstered backs are high and soft, and consequently are very comfortable for reclining upon when sitting up during the day. Each seat has a double cushion, which makes it more desirable for day travel. Under the cushion is a folding box, giving ample room for bedding of all kinds, curtains, head and foot board, and other paraphernalia incident to railway accommodations. An adjustable table is provided for each seat, which, by the use of a neatly-executed bracket,

fastened upon the side of the car, can be used for a single or double seat, so that one, two, three, or four persons can sit at the one table. When the berths are to be made up the box below is unfolded and supported by movable rods to form the bottom of the lower berth. The cushions are then opened, placed upon this foundation, and the lower berth is complete. The backs of the seats are next turned up, each over its own seat, and being brought together on a horizontal line in this elevated position, are joined together by a bolt, the arms of each back being fastened securely at the same time by an automatic spring-bolt or sleeve. The partitions are made of fixed wooden folds, those for the upper berth dropping from the ceiling and those for the lower berth being drawn horizontally from the side of the car. The curtains for each berth are separate and distinct, whereby a passenger above, desiring to retire, can draw his curtains without inconveniencing his fellow traveler below. The change from a day car to a sleeper is complete, and were all on board to retire at the same time, that change would be almost instantaneous. The bed of the lower berth when made up is 10 inches, and the upper berth 3 feet 8 inches from the floor of the car, bringing all the weight below the middle line of the car and nearer to the trucks, and lessening the swaying motion which is so annoying to travelers. The occupant enjoys the advantage of being able to sit upright in either upper or lower berth. Every person occupying a seat is supplied with sleeping accommodations, and on the receipt of a comparatively nominal sum, a company could supply a passenger with a single berth to himself should he desire it."

How the Thing was Managed in the Old Flush Times.

In the ante-panic times just previous to 1873, the building of a railroad through a section of new country abounding in undeveloped resources was apparently about as easy a thing to do as to run in debt or slide down hill. The process, as described by a chronicler of the period, was somewhat as follows:

As a starter, the first thing to be done was to get the people interested in the project. This was done by calling meetings in every county along the proposed line, making eloquent speeches, figuring up the prospective advance in the price of land as soon as the road should be built, and boldly proclaiming that the year of jubilee had come. In this way every body is soon made to see a big thing looming up just ahead—not an air castle, but something as substantial as a projecting spur of the Rocky Mountains. There is a great deal of talk about subscriptions, right of way, mortgages, bonds, etc., and every property owner is ready to pledge life, liberty and sacred soil, and all that kind of thing, to get the road. Then the company is organized, and a set of officers chosen. Here the trouble begins. About every subscriber expects to be an officer, and a good many are necessarily disappointed. The officers elect feel happy, and vote themselves good salaries. Then they travel over the line of the road and have a few big dinners, all of which is charged up as expenses to be paid out of the company's fund. Meantime there is a good deal of surveying done, numerous lines are run, and every director feels it to be a duty to put all his idle relations on the road. An engineer is engaged with four assistants, twelve chain men, nine flag men, twelve pioneers, five wagon men and seven helpers, to do five men's work. This makes the ins happy, and the outs begin to swear and refuse to pay up their subscriptions. Then an attorney for the road is appointed, and about 1,200 law suits commenced. By this time the line is decided on, and as the directors don't happen to own property in a straight line, the road must needs crook in and out so as to take them all in. This makes more trouble, and after the route is fully decided on, all the property owners who are not directors swear that the road will ruin them, and refuse to give the right of way. They argue that as their land will be worth $1,000 an acre after the road is built, they must be paid this price for what the road occupies. To deal with this new trouble, the attorney advises more suits of about forty different kinds. Injunctions are obtained to stop operations at various points, contractors sue for damages, and things generally get very much mixed. The officers begin to feel that they are poorly paid. They vote to increase their salaries, and appropriate to themselves what little money they are able to raise. By this time, if things have been shrewdly managed, the road is heavily in debt to the contractors and every body else, and the attorney, president and directors, talk learnedly about the bonded debt, first and second mortgage bonds, the floating debt, and twenty other kinds of indebtedness. Some of the creditors become disgusted and want their money, and then come arguments in bankruptcy, motions for a receiver, and other little arrangements for winding up the first administration of affairs. Finally, the road and every thing that has been done is turned over to new hands, probably the contractors or some other creditors, the directors howl about being swindled, and the smaller creditors wonder how the thing could be so neatly done!

End Framing of Box Cars.

Mr. John Ortton, of the Canada Southern road, writes as follows in reference to the diagrams on Page 48 of April CAR-BUILDER:

In forming an opinion as to the best methods of framing the ends of box cars, we have to consider two things; first, what is required, and second what should be avoided. First, then: we require that the end shall maintain its rectangular shape against any influence tending to alter it, and be a support to the roof and sides and general surroundings. Second: while making the end strong and rigid we must avoid using more material than is necessary, and the strengthening of one part at the expense of weakening another.

In my opinion, diagram No. 1 meets in the best way the above conditions, for the reason that the rectangular shape is made certain by the diagonal braces which counteract any side-thrust arising either from inside or outside; and, by spreading the bottoms of the braces toward the ends of the end sill and joining their upper ends to the body posts, they form the strongest support to the roof, without throwing any material strain on the center part of the end sill, where, ordinarily, is concentrated immense strains from the weight and action of the bunter and draft fixings.

In diagram No. 2, the diagonal braces tend to weaken the center of end sill, and give but little support to the roof.

Diagram No. 3 is the most effective bracing for maintaining the rectangular shape of the end; but, in other respects, it is not, I think, equal to No. 1.

AT the meeting of the Engineers' Club, of Philadelphia, held on April 16th, Mr. C. W. Buchholz read an interesting paper, calling attention to the rapid increase, during late years, in the weight of the rolling stock of railroads, especially in the locomotive and in the concentration of enormous loads upon one pair of drivers. He described the effect of this heavy weight, when hurled at the rate of 60 miles per hour, or 88 feet per second, upon a light iron bridge, and urged the necessity of employing competent engineers to design and build such bridges, and of holding them to a rigid responsibility. He doubted the efficiency of trussed bridges with parallel chords and pin connections for spans under 150 feet long, under the present condition of large railroads using modern locomotives and running at a high rate of speed. He suggested solid plate girders and riveted arched trusses as being stiffer and more permanent.

Standard Passenger Locomotive of the Pittsburg, Fort Wayne & Chicago Railway.

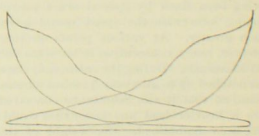
The following are the dimensions, weight, etc., of this engine, of which we give a full page engraving, with tender:

Cylinders	17x24	in.
Outside diameter of boiler	53½	"
Thickness of steel plates	⅜	"
Number of tubes	162	
Length of tubes	11	ft.
Outside diameter of tubes	2	in.
Inside length of fire-box	72	"
Inside width of fire-box	35¾	"
Inside depth of fire-box	66	"
Square feet of grate surface	17.8	
Square feet heating surface of fire-box	115.8	
Square feet heating surface of tubes	932.6	
Total feet of heating surface	1048	
Diameter of cylinders	17	in.
Stroke of piston	24	"
Length of steam ports	15	"
Width of steam ports	1¾	"
Width of exhaust ports	2½	"
Travel of valve	5⅛	"
Outside lap of valve	1	"
Inside lap of valve	none.	
Diameter of piston rod	2½	in.
Diameter of driving wheels	5	ft.
Diameter of truck wheels	30	in.
Center to center of driving wheels	8 ft. 9	"
Wheel base of engine	22 " 6½	"
Wheel base of engine and tender	43 " 7	"
Diameter of driving axle journal	7	"
Length of driving axle journal	8	"
Length of main crank pin journal	3¾	"
Diameter of main crank pin journal	4	"
Diameter of parallel rod journals	2½	"
Length of parallel rod journals	2¾	"
Weight on driving wheels	52,450	lbs.
Weight on truck wheels	28,960	"
Total weight of engine	81,410	"
Weight of tender, loaded	52,300	"
Capacity of tank	2,100	gals.
Weight of tender, empty	21,675	lbs.
Height of smoke stack above rail	14 ft. 10	in.

Recent experiments with this engine on passenger trains between Fort Wayne and Chicago (a distance of 148 miles), with trains varying from six to nine cars, maximum grade 25 feet per mile, gave the following average results for six trips:

Coal consumed per trip	9,558	lbs.
Water consumed per trip	52,511	"
Water per pound of coal	5.41	"
Coal consumed per hour	2,220	"
Coal consumed per car per mile	10	"
Coal per square foot of grate per hour	130 to 160	"
Hours per trip, actual running time exclusive of stops	4.6	"

The engine frequently attains a speed of 60 miles an hour on its regular run. We give herewith an indicator diagram taken at this speed with a train of eight passenger cars.



The diagrams were taken with a Thompson's indicator. The engraved copies have a vertical scale of 120 lbs. to the inch. An Allen valve was used, cutting off at 4⅜ inches of stroke of piston; boiler pressure 132 lbs. per square inch; high exhaust nozzle, compound, 4 inch single, and 3¼ inch double; back pressure 5 lbs.

THE Silver Lake Co., of Boston, has received an award of first degree of merit from the International Exhibition, at Sidney, Australia, for its solid braided cordage there exhibited.

Thomas A. Scott.

The particulars of the illness and death of the great leading railway magnate of the land, and of the leading events of his life, are so fully given in the daily papers that we need not allude to them here. In the accumulation of a private fortune, or in the personal ownership of railway property, he has doubtless been surpassed by some of his rivals. In this respect the appellation we have given him may not be strictly appropriate. But when his career is traced from obscure and humble boyhood through the rapidly succeeding stages of promotion, until, at the early age of 34, he assumed the general supervision of the Pennsylvania Railroad, and for more than twenty years was its chief director and master spirit, it will hardly be denied that, in respect to the rare and peculiar qualities requisite for such a trust, he was a magnate indeed. He was endowed with just those physical and mental capacities best suited to the sphere of activity in which his life was spent, and these capacities were developed to the utmost. He set, as it were, a target before him, and his aim was never diverted from it. Whatever of clear perception, concentrated thought and unerring judgment he possessed, aided by unremitting application and a wonderful executive ability, were directed to one end—to increase the earning capacity, value and public usefulness of the great railway property intrusted to his control, the present condition of which is a sufficient monument to his success. We add the following extract from one of the published notices of his career, as indicating some of his personal traits and peculiarities:

"Col. Scott was not killed from overwork. He had a wonderful physique, and he drew on it after the toils of the day. He enjoyed good company, and after leaving his office or returning from a long journey he spent hours that should have been devoted to sleep in recreation. He was a high liver, and he enjoyed whist and poker and social amusements. Up to the hour when attacked by paralysis he had lived without sickness. The failure of his physical powers finally sent him to the grave. His peculiar strength lay in the rapidity with which he reached a conclusion. A case would hardly be stated before his reply was ready. His perception was intuitive, and his judgment marvelously accurate. He rarely erred. He transacted an almost incredible amount of business with perfect ease. When exhausted he dropped asleep on the instant, whether on the cars or in his office, and snatched needed rest. He dispatched business with electric facility. He dictated to his stenographer with lightning rapidity. In business meetings his speeches were short, terse and clear. Suggestions flashed from his mind apparently without effort. He had the capacity of ridding himself of difficult questions in a moment. One subject dropped he immediately seized another. He was punctual in engagements. Every contract was scrupulously fulfilled. He made few promises and kept them. A more faithful friend never breathed. His kindness of heart was proverbial. Even his enemies were encompassed by his generosity. No man has ever been more endeared to his business associates. He never forgot the men who served with him when a clerk, agent or superintendent. As the active head of a great corporation, he never gambled with his interest at the Stock Exchange, and never turned what belonged to others to selfish or mercenary ends. He enchanted strangers by his geniality and freedom from reserve. Col. Forney describes a scene in a manager's car on the Pennsylvania Railroad. He was conversing with its President. At every station dispatches were brought to Col. Scott. He tore them open, promptly answered them, and then resumed the thread of the conversation. Occasionally a railroad president or superintendent, belonging to another State, would come in at the door while the train waited, state his case and receive his reply. Sometimes a negotiation would be conducted between the stations, and yet at the end of each the Colonel would move over to his friend and renew his pleasant talk. He was five feet eight inches tall, as straight as an arrow and perfectly symmetrical. Earlier in life he had brown hair and beard, but latterly his hair was thick and gray, and he wore gray side whiskers."

The Allen Slide-Valve.

The Pennsylvania Company's passenger locomotive, No. 158, illustrated in this issue of the CAR-BUILDER, is reported to have made a run, during a trial of its speed, of 6 miles in 5 minutes and 13½ seconds, an average of a mile in 52½ seconds, or a fraction less than 70 miles an hour. Its capacity for speed is due to a very considerable extent to a well designed valve gear, which includes the Allen slide-valve. The supplementary channel or port of this valve is its special feature, and is cast in it, as shown at *A A*, in the cuts. The valve is so arranged that when it opens the steam port *S*, at *D* (Fig. 2), the supplementary port is opened at *C*, and steam is admitted to the port *S* through both openings simultaneously. When the valve uncovers the port *S* 3/16 of an inch at *D* (Fig. 2), it opens this auxiliary port the same amount at *C*, thus practically giving a width of opening of ¾ of an inch. In this way the valve, when cutting steam off short, as is usually the case when a locomotive is running at high speed, gives just twice the width

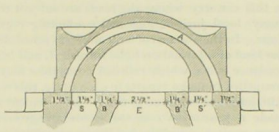


Fig. 1.

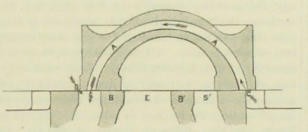


Fig. 2.

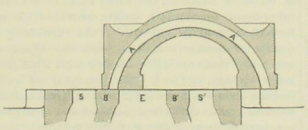


Fig. 3.

and area for the admission of steam, and thus secures a higher pressure in the cylinder during admission, and more nearly up to boiler pressure. As a higher pressure of steam in the cylinder enables a locomotive to do a given amount of work with a shorter cut-off, and consequently to work steam more expansively, this valve works it, therefore, more economically than does the ordinary valve. It is said that it will do the same amount of work at a point of cut-off one-fourth shorter than that of the common valve.

Fig. 1 shows the valve on the center, and Fig. 2 at the end of its travel. The dimensions of the valve seat are shown in Fig. 1. The supplementary port is 3/16 inch, and the thickness of metal between it and the edge of the valve is 3/16 inch. The lap is one inch outside, and none inside, and the travel 5 3/16 inches.

This valve has been put in a few passenger engines of the New York Central & Hudson River road, and in every case they are found to work more efficiently than they did with the ordinary valve. They are, in fact, the smartest and strongest engines of their class. The proportions of their valves vary a little from these illustrations in order to adapt them to the old valve seats, which have 1½ inch steam ports, 1⅛ inch bridges, and 2¼ inch exhaust ports, and are 10½ inches over all. The valve is 9½ inches, with an exhaust cavity of 4½ inches. The metal between the ½ inch supplementary port and the outside of the valve is ½ inch thick, and supported by two bars.

Stock-Watering.

The capital stock of a corporation, in order to have the character of property in a legal sense, must, when issued, have a foundation to rest upon. There must be some legal consideration either in money paid or contracted to be paid, otherwise the stock so issued represents nothing, and has none of the characteristics of property. This principle applies to the original shares as well as to any subsequent issues in the form of increased stock. An increase of the nominal capital of a railway or other corporation by the issue of new stock certificates, is usually regarded as a watering process, or the creation of what has no representative value. This, however, is not necessarily so. Every thing depends on the actual character of the transaction. If the increased issue is a legitimate one, it should have a basis of its own, independently of the property fairly represented by the original shares. Such basis may consist of new subscriptions, money borrowed and applied for the purpose of improving the property, or the expenditure upon it of surplus earnings, or of dividends withheld from shareholders. In such case, the new stock is practically a funding of dividends or accumulated surplus, or of outside capital borrowed, and is just as much entitled to a return in the form of dividends as is the capital originally paid in. If the new stock represents an equivalent value in property, the issue of it can not with any propriety be called a watering process. But if it represents no such value, it is fictitious, and a fraud upon the public, whether it is held in law to be so or not.

Judge Speir, of the Superior Court of New York, in sustaining the injunction against the issue of some fifteen millions increased capital of the Western Union Telegraph Co., defines the law as prohibiting the issue of such capital in the absence of any foundation, as above stated; and furthermore, as prohibiting such issues to represent the investment of earnings in the purchase of equipment, additional lines and plant. These accumulated earnings, he says, are assets which belong to the shareholders, and can not be distributed among them in any other form than as dividends. Or in other words, the law can not force the shareholder to subscribe to capital as equivalent to receiving cash. If this view of the matter is sustained by the appellate courts, it is pretty clear that an injunction will lie against every stock-watering scheme hereafter set on foot in this State, whatever may be the effect upon schemes already accomplished.

A BOY on his travels, writes from Philadelphia to his mother, as follows:

"Dear Mother.—We got here. We went in a sleeping car, and a black man let down a little cupboard and made a bed in it. I slept in the top cupboard, and Uncle Ben down below. It had sheets just like a bed, only I bumped my head pretty often. I climbed up. It was worse than a tree. There was a lady, and she had to sleep up high too. She didn't climb; the man brought some stairs, and she went up on 'em, and worked herself in. There was a little baby, and it cried worse than Tooty, and some snored, and my bed joggled. Uncle Ben's bed didn't joggle, and so I got in with him. There is a horse car in New York, and we rode in it. A man comes in, and everybody gives him some money. He has a silver thing that rings to make him honest. The women come in and stop and look at some other man, and he stands up and she sits down, except the one with the old bonnet on."

NATIONAL CAR BUILDER

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

SUBSCRIPTIONS *to the* CAR-BUILDER *will be received, and copies kept for sale, at the following places:*

A. WILLIAMS & CO., 283 *Washington Street, Boston, Mass.*

L. SCHAFFNER, *Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.*

WILLIE H. GRAY, 306 *Olive Street, St. Louis, Mo.*

ROBERT CLARKE & CO., 65 *West Fourth Street, Cincinnati, Ohio.*

Master Car-Builders' Association.

The fifteenth annual meeting of this Association will be held in the city of New York, commencing on Tuesday, June 14. The Park Avenue Hotel, on Fourth avenue, has been selected as headquarters.

The meeting promises to be an unusually interesting one, in view of the many important subjects to be reported upon by the committees, and the discussions to which these reports will probably give rise. No member of the Association should allow any considerations of a trifling nature to prevent his attendance. There are too many absentees at every annual roll-call, and though this is unavoidable to some extent, it implies none the less a certain degree of indifference in respect to the advantages to be derived from these meetings. Many of the members who have the well-being of the Association at heart have expressed the opinion that the occasional presence of a railroad manager or superintendent would not be considered intrusive, but on the contrary quite otherwise. A few words from the higher officials would not only add to the interest of the discussions in many cases, but would be an encouraging recognition of the Association as an efficient instrumentality in promoting railroad progress. But as these gentlemen have hitherto held aloof, their presence in any considerable numbers can hardly be looked for at this year's meeting. It is to be hoped, however, that they will evince their good will by extending every needful facility to master car-builders to enable them to leave their shops for a week, not for recreation and pastime, as is sometimes alleged, but to look after the general interests of car rolling stock, and the car departments of the roads.

RAILROAD STATISTICS.

The need of more full, accurate and detailed information in the form of railroad statistics increases with the growth of the system, especially in this country where the roads are subject to so many local jurisdictions and conflicting regulations. In the absence of any uniform schedule of the kind of information to be furnished, and in accordance with which railroad companies may be compelled to make reports in each State, this want will doubtless continue to exist. A movement was made a year or two ago to secure an agreement upon such a schedule by the several State commissions, but no very important result was reached so far as we are aware. In order to accomplish any thing really valuable in this direction, it is obvious that railroad officers themselves must take the matter in hand and be the chief instigators of what is done. Of this, however, there is at present not much probability. Each road or system of roads is virtually an independent organization, the managers of which are concerned only in promoting its interest as a business enterprise. There are also different classes of roads. The officers of one class would like to know all about the operating economy of those of another class, or of other roads of the same class, even to the subordinate mechanical details, provided the information could be had without the furnishing of similar information in return; while the officers of not a few roads are quite satisfied with what they know already, and look with distrust if not indifference upon any knowledge derived from outside sources. Some of the best managed and most prosperous roads keep certain statistical records of their own which contain valuable information, but which are rarely if ever published, and in some cases are not even used for their own advantage. Upon other roads no such records are kept on account of the expense which it entails. The cost is presumed to be more than the information is worth, although the truth may be that the information thus obtained is very much undervalued. Under these circumstances any general agreement or co-operation is next to impossible, but the time will come when the value of such statistics will not only be acknowledged by every intelligent railroad official, but the labor expended in their preparation will be regarded as a profitable investment.

The statistics now to be found in State commission reports, manuals and elsewhere, are exceedingly valuable as far as they go, and as far as they are accurate and reliable. But our great railway system will be more worthy of the name, when every company shall be under an imperative obligation to make reports at stated periods according to a uniform schedule, so framed as to require only what is really attainable, and what can be had without costing more than it is is worth. It is useless to expect that roads in different States, subject to different kinds of management, some earning dividends and a surplus and some struggling to meet current expenses, will voluntarily make reports to suit the compilers of manuals or the mere statistician. Their reports will, in the absence of strict legal requirements, be full and explicit, or meagre and confused, as may best suit the interests of those who make them. Far better would it be if all roads could be placed on the same footing, and be made the mutual sharers in a common benefit.

The reports that are now made contain much that is valuable and well arranged in reference to traffic and earnings, but we search them in vain for any explicit details of car equipment and construction, the proportions of dead and paying weight, the comparative service of wheels, dimensions of axles and journals, and the various things that are the subject of inquiry in the circulars sent out every year by the committees of the master mechanics' and car-builders' associations, and in regard to which it is so difficult to obtain information except in homeopathic driblets. In regard to railroad accidents also, the information to be derived from the sources referred to is extremely limited. It seems to us that if a complete record could be obtained of these casualties, and if they could be classified and tabulated, and made accessible to the public, the injuries and loss of life upon railroads would be materially diminished by the exercise of greater precaution, and that any one desiring to know the magnitude of the annual car-coupling death-roll, would with little trouble have his curiosity gratified.

THE GENERAL CONDITION OF FREIGHT CARS.

The letters we print on another page, written by four prominent master car-builders, and read at the last monthly meeting at the association rooms in this city, are worthy of special attention. The information they contain with respect to the general condition of freight cars is the more valuable for the reason that it comes from different sources, and embodies the experience of those in charge of the car departments of different roads. If similar letters had been written by the car-builders of every road interested in through freight traffic, they would no doubt have presented a mass of concurrent testimony, in reference to the evils of diversity in construction, that managers could not well blink out of sight. Taking the evidence furnished by Messrs. Aylesbury, Coulter, Miller and Ortton, as a fair criterion of the truth, it appears that the great majority of freight cars now in service, and especially those of more recent construction, exhibit many decided improvements upon those built ten years ago. They are stronger and heavier, and have greater carrying capacity in proportion to their weight. The wheels and roofs are better; "man-killers," in the form of buffer-blocks, have almost entirely disappeared; the height of draw-bars is more uniform; automatic couplers are more used; the standard axle is growing in favor; and more attention is paid to brake-staffs, running-boards and other subordinate parts; and the statement by Mr. Coulter, that cars generally do not show the marks of age as much as they formerly did is an evidence not only of better construction but that cars are kept in better repair. This progress is no doubt largely due to the efforts of the Car-Builders' Association; and whatever future progress is made will depend very much upon the same source. What has already been done is comparatively of minor importance in view of the advantages to be derived from uniform axles, drawing attachments, standard oil-boxes and journal-bearings, and a freight train brake. In respect to these, the mechanical difficulties, although formidable, are not insurmountable. The roads will in time drift into

these reforms from sheer necessity, but the evil days might be shortened very much by a little timely effort and co-operation. Take the matter of draw-bars, for example. Their name is legion. Nearly every road has a pet arrangement of its own. The men on the road like it because they are used to it, and they are not willing that their bantling should be displaced by another even if it is a trifle better in some respects than their own. This is very natural and the feeling is apt to be shared by managers as well as by subordinates. Nor would there be any peculiar weakness or foolishness about it if it related to the construction of a common road vehicle, to be used independently of all other vehicles, and forming no part of a general and widely extended system. The owner could in such cases indulge his partialities without detriment to others. But with respect to freight cars running all over the country in long trains, each car sustaining a certain fixed relation to every other car, the case is vastly different. The interchange of cars in through freight traffic makes each individual car as much an integral part of one system as a single link is of a chain, and hence the absurdity of any unnecessary difference in the drawing and running gear of different cars.

This subject of uniformity is fearfully threadbare, and it is difficult to allude to it without useing language which implies that railroad men are apathetic because they do not sufficiently appreciate the advantages of a reform in this respect. We do not, however, wish to imply or say any such thing. They understand the nature of the trouble thoroughly, and also the obstacles in the way of a remedy. But, as the earth turns round, and they with it, so will they and the roads they manage involuntarily and inevitably drift toward the consummation of what is so much desired. The only question is as to whether the thing could not be hastened a little by organized concerted action.

PARLOR CATTLE CARS.

A car of this description has been constructed and has made a trial trip from Cincinnati to New York, carrying twenty "fine looking steers." The animals are said to have rested and slept as comfortably as if they had been housed in a barn. The car is said to weigh 26,000 pounds, but its dimensions and cost are not stated. There are ten stalls on each side, separated by elastic skeleton partitions placed diagonally instead of at right angles with the sides of the car, the cattle standing in two rows with their heads toward the outside. A supply of water is carried in a vulcanized iron tank running along the centre of the roof; and just above the head of each animal is a reservoir of corn or other feed. By moving a lever, each of them is supplied with the necessary allowance of feed or water. The cattle can, it is said, be loaded or unloaded quickly through either end of the car, and what is more important than all, can lie down and rest whenever they feel like it.

If there is no exaggeration about this, and no increased cost of transportation except what is compensated for by diminished shrinkage and a better condition of the stock on reaching its destination, then we do not see but the perplexing cattle car problem, both in its humane and economical aspects, is effectually disposed of. As we have already said in previous articles on this subject, it is a question of floor area. For the animals to lie down and rest in the cars during transit, the floor space must bear a certain proportion to the number of cattle. Upon this depends the cost of transportation, which practically overrides all other considerations; for it is absurd to suppose that one road is going to run "parlor" or "drawing-room" stock cars merely to promote the comfort of the stock, while a rival road with the ordinary cars can get the business at lower rates and make the same or a larger profit. There is no great difficulty in carrying feed and water in the cars, nor in supplying it at stations without unloading. Much could be said in favor of either method as being preferable to the other; but this is not the point. During long trips the animals need *rest* either in the cars or out of them. If the Kitsee diagonal stall car or any other plan will supply this need with no material increase of cost, and if the roads will adopt this plan and stop using the present style of cars, it will be a great boon to the cattle as well as to the patentees of the invention.

INVENTORS AND INVENTIONS.

Although the relative proportion of prizes and blanks in the matter of patented inventions is about the same as that between a kernel of wheat and a bushel of chaff, a knowledge of the fact is no discouragement to those who have been fairly inoculated with the mania. The fascination consists in the more alluring fact that fortunes have been made, are now being made, and will continue to be made by patentees; and although the field as respects railway appliances is becoming a little more contracted than it was a dozen years ago, there are still a few chances left for inventors who have the natural aptitude and capacity to profit by them.

There are several classes of inventors, but the most successful are those who look the most thoroughly into the subjects to which their inventions are intended to apply, out of whose minds new contrivances grow as grass grows out of the earth, who are full of mechanical expedients and resources, and bring them into play, not mainly to secure patents and royalties, but because it is the natural bent of their minds. This class may not accumulate fortunes, owing to the lack of business tact, capital or energy, but they are the genuine inventors. There is another class whose capacity has no other stimulus than money-making. Their end and aim is to get a patent, establish a little monopoly of their own for the time being, and secure a sufficient income for their future needs without being dependent upon the drudgery of ordinary pursuits. This class is largely made up of what may be called amateur mechanics. If they become possessed of an idea that is new to them, they fancy it must necessarily be new to everybody else. They conceal it as a prize for fear it will be stolen, until a patent is secured, and then it is let loose upon the unsuspecting world. The inventor is sure the paternity of the thing centers entirely in himself, and although it may be the ghost of some previous discovery, the model of which is embalmed among the forgotten relics of the patent office, he fondles it, and dotes on it, and proudly points to his patent as putting the seal on its intrinsic value. He has no more doubt that it will scoop the market than he has that the multiplication table is a fixed fact. Whoever ventures to point out or hint at any defects is very apt to be regarded by the inventor as a personal enemy. Show him that it conflicts in any respect with the fundamental principles of mechanics and it is all the worse, from his point of view, for the fundamental principles. Laugh at him, and he is more determined than ever; flatter him, and you only add fuel to the flames. He sees a good thing looming up in the distance, and fails to realize that patented inventions have ceased to be novelties. He forgets that their name is legion, and that even those that have real merit have to fight their way to a moderate appreciation, while the myriad of worthless ones stand no chance at all. A man whose inventive capacity is stimulated only by the prospect of gain, may rest assured that the marrow of the thing is not in him, and that any success he may achieve will be mere luck, like that of a blind man who happens to put a ball through the center of the target.

Many good inventions fail of profitable recognition because they are premature. They propose innovations which existing prejudices will not sanction, and are consequently regarded for the time being as impracticable or visionary. All such must bide their time. Railroad men as a class are not prejudiced against alleged improvements because they are patented, but it is possible that many good inventions of this kind remain for a time unrecognized from sheer inability on the part of the roads to discriminate by actual test between what is valuable and what is worthless. They must have some evidence of the merits of devices that are brought to their attention, aside from the representations of inventors and patentees. A mere statement of what is claimed in their behalf by interested parties, even when it is supported by a string of first-class testimonials, does not produce a very stunning impression upon superintendents and managers, nor do they want in such cases an elaborate estimate of hypothetical savings. They want to know just how the device will work in practice. The saving it will accomplish they can figure up at their leisure, or if they do not figure it at all it will be none the less on that account.

SOME MINOR DEFECTS IN OUR PASSENGER CAR SERVICE.

It will be admitted by most people who have traveled much in this country and in Europe that our ordinary day cars—or "coaches," as they are now called—are far better calculated to promote the comfort of those who ride in them than are the second or even the first-class carriages abroad. The seats are handsomely upholstered, and even luxurious, besides being reversible; the inside finish of the cars is in most cases of fine cabinet work; there is a window to every seat that can be opened or closed at will; in cold weather there is a plentiful supply of artificial heat, and at all times there is tolerably good ventilation. Passengers can pass from one car to another whenever they choose, and each car is provided with a retiring closet, the lack of which upon railway carriages abroad is a matter of general complaint. Our baggage check system, by which the passenger is relieved of all concern about his trunks, be they ever so numerous, is another convenience which foreigners greatly appreciate because it is new to them; but with us it is no new thing. Notwithstanding all this, and much more that might be said in behalf of our passenger service, there is still a margin for improvement in some respects. One very manifest defect is the want of suitable regulations to facilitate the getting in and out of trains at stations, particularly the larger stations. The cars having only a narrow door at each end, opening upon a narrow platform elevated three or four steps above the station platform, much inconvenience is caused by the efforts of people to get in and out at the same time, the two opposite currents often causing a crush and deadlock, and not unfrequently ill feeling and incivility. An attempt has been made upon some roads to remedy the evil by posting notices in the cars and at the stations, requesting people to enter at the rear end of the cars and pass out at the forward end, but for obvious reasons the plan has not proved very successful. Common sense would seem to suggest that passengers inside who want to get out should have precedence, on the principle that a cargo must be discharged from a vessel before a new one can be taken. This, in many cases, is provided for by means of gates to keep ingoing passengers in check until the way is clear, thus saving time, allaying impatience and preventing disagreeable friction.

Our railway baggage system—an admirable one

as at first projected—has been abused by being carried beyond its proper limits. An enormous amount of non-paying weight is carried over our roads at all times, and especially in summer, in the form of personal baggage, that should be subjected to charges in justice to the roads, as well as to the parties who own it, and to persons who travel with less than the minimum allowance. The road companies are responsible for all checked baggage without regard to excess of weight, and some of it is very valuable. Why should the risk of loss be incurred in such cases with no adequate remuneration?

The hawking of miscellaneous merchandise through the trains in the form of flash literature, prize candy, peanuts and other abominations, is the cause of much annoyance to passengers, especially those of the more fastidious sort. It has even been charged that upon some lines the practice is connived at if not encouraged by the companies, for the purpose of driving people into the drawing-room cars. We do not think the aspersion is just; nor do we think the peddling pests are subsidized by the parlor car companies. The practice is tolerated simply because no general protest is made against it. It is none the less annoying, however, to a large class of passengers, and if not abolished altogether should be subjected to reasonable limitation.

Another striking defect of our system is the exposed and accessible condition of the tracks at stations, allowing trains to be approached from all directions, and enabling people who are a little behind time to make a dash for the train after it is well under way. The safety of the performance in such cases depends upon the agility of the performer. If he misses his aim and goes under the wheels, it is simply an "accident" brought about by "contributory negligence," and for which the company is in no way responsible. The almost equally perilous practice of jumping from the car platforms while trains are under headway is widely prevalent. A legal penalty for boarding or jumping from a train while it is in motion, would have a salutary effect in preventing these foolhardy risks of life and limb. But with our inflated notions of individual freedom, every person prefers to be a law unto himself in such matters, until injury or death is the result, and then a claim for damages is very likely to be made by the victim or his representatives.

WE are requested to state that on the second day's meeting of the Master Mechanics' Association (at Providence, R. I., June 14) the standing committee will report the subjects to be discussed at the next annual meeting; and that master mechanics, railway managers and others are earnestly requested to favor the committee with a list of such subjects as may be appropriate, and that they may desire to have investigated. Communications should be addressed to James M. Boon, Chairman, Fort Wayne, Ind.

The Tradesman, a Southern trade journal published at Chattanooga, Tenn., is a valuable and reliable record of manufacturing, mining, railway and mercantile enterprise in that section of the country, and the South generally. It contains 16 four-column pages, containing an excellent variety of original and selected reading matter, and a good line of advertising—this last feature showing that it is liberally appreciated by manufacturers and dealers, at the North and elsewhere, as a medium for extending their trade. Published semi-monthly by the Tradesman Publishing Co., Chattanooga, Tenn. Price $2.00 a year.

MR. JOSHUA ROSE, a well-known mechanica writer, and the author of several practical treatises on the steam engine, has been admitted to an interest in the publication of the *Mechanical Engineer*, and will in future be one of the editors of that journal.

The Elevated Railroad Journal has been enlarged, and—well, there was not much room for improvement.

CHAS. R. YANDELL & CO., 6 East 18th street, New York, have a fine assortment of stamped and embossed leather for ornamental upholstering. The samples embrace a great variety of exquisite patterns in various shades of brown, deep red, olive green, and gilded, manufactured in their own shops from designs and engravings in metal. The leather is dyed (not painted), is very pliable and durable, and the figures remain permanent. It makes a handsome and serviceable car seat that is comfortable to the sitter at all seasons, and it can also be used with fine effect upon panels if applied according to direction. A piece of muslin is first glued to the edges of the wood-work only, and the leather is then glued to the entire surface of the muslin. In this way the wood can shrink or expand without affecting the leather. At the warerooms of this firm may be seen many beautiful specimens of leather wall-cabinets, curtains, lambrequins, table covers, etc.; also some well preserved relics of leather ornamentation used three centuries ago.

VALENTINE'S VARNISHES are becoming almost a criterion of American enterprise, having been awarded the first prize at the Melbourne (Australia) Exhibition. They received also a similar token of approval at our own Centennial Exhibition, and more recently at the Paris Exhibition. They are now successfully competing with English varnishes in Europe; and in this country the importation of varnishes is yearly decreasing.

THE United States Circuit Court (Chicago) has decided that the valve kuown as the Richardson safety-valve, manufactured by E. B. Kunkle, of Fort Wayne, Ind., is an infringement of the Richardson patent owned by the Consolidated Safety-Valve Co., of Boston.

THE Globe Ventilator and Chimney Cap, manufactured by the Globe Ventilator Co., of Troy, N. Y., has recently been officially indorsed by the Eastern Railroad Association, which is a substantial guarantee that the patents covering the device are valid, and can not be infringed with impunity.

"CARTER'S INKS" received three awards, all first degree of merit, from the world's fair just closed at Melbourne, Australia. Last year these inks also took the highest awards at the International Exhibition at Sydney, Australia

THE long pending interference suits regarding the validity of the patents of Mr. John H. Greenwood, of Columbus, Ohio, for planing curved metal surfaces, have been decided in his favor by a full recognition of the rights and claims of the patentee.

VEN some man slaps me on der shoulder und says, "I vas glad to hear you vas so vell" und den sticks behind my back his thum to his nose, I haf my opinion of dot feller.

A MAN down East has exploded the popular fallacy that a man must advertise to succeed in business. He commenced business 47 years ago with a capital of $800; he hasn't spent a cent in advertising since, and he is now worth $805.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Alabama Central.—Mr. John F. O'Brien has been appointed General Superintendent. Mr. John M. Bridges will continue with the road as Division Superintendent.

Boston, Concord & Montreal.—Mr. George A. Ferguson has been appointed Superintendent of Motive Power.

Chicago, Rock Island & Pacific.—Mr. F. A. Marsh has been appointed Purchasing Agent in Place of Mr. A. Manvel, resigned. The office of Superintendent, which Mr. Manvel also held, will be abolished. General Superintendent A. Kimball will remove his office from Davenport to Chicago.

Cincinnati, Sandusky & Cleveland.—This road has passed into the hands of the Indiana, Bloomington & Western, and will be known as the Ohio Division.

Cleveland, Columbus, Cincinnati, & Indianapolis.—Mr. W. C. Gilmore has been appointed Master Mechanic, and Mr. A. G. Steinbrunner General Foreman of car department.

Frankfort & Kokomo.—Mr. W. J. Craig, of Frankfort, Ind., has been appointed Manager and A. W. Hazelrigg Superintendent.

Grand Trunk.—Mr. S. R. Callaway, late of Detroit & Bay City, has been appointed Superintendent of Chicago Division, with office at Chicago.

Hannibal & St. Joseph.—Mr. Tho. G. Gorman, Superintent of Motive Power, has resigned his position, to take charge of extensive locomotive and car works, at Kingston, Canada.

Hannibal & St. Joseph.—Mr. James Long is appointed Superintendent of Motive Power and Machinery and Car Department, vice Mr. T. G. Gorman, resigned.

Knox & Lincoln.—Mr. Wm. A. Field has been appointed Master Mechanic in place of Mr. E. Bolton, resigned.

Minneapolis & St. Louis.—Mr. A. H. Crocker has been appointed General Superintendent. He was recently on the Chicago, Burlington and Quincy.

Manhattan Elevated.—Mr. James Tobin has been appointed Purchasing Agent.

New York, Lake Erie & Western.—Mr. C. C. Waite has been appointed Assistant to the President. Mr. Waite has for several years been connected with the Pittsburg, Cincinnati, & St. Louis road, and more recently as Superintendent of the Miami Division.

New York & New England.—Mr. J. C. Rawn has been appointed Superintendent of the Western Division, in place of J. T. McManus resigned.

Ohio & Mississippi.—Mr. J. F. Sechler, General Master Mechanic, has resigned to take charge of the new car works, at Marshall, Texas. He is succeeded by Mr. Arthur Donaldson as Division Master Mechanic.

Oregonian.—Mr. J. M. Fillmore has been appointed General Superintendent, and Mr. James Welch Master Mechanic, with offices at Portland, Oregon.

Painesville & Youngstown.—Mr. George M. Patten has been chosen General Superintendent, succeeding Miles R. Martin, late General Manager. Mr. Patten was formerly on the Maine Central.

Selma, Rome & Dalton.—This road has been purchased by the East Tennissee, Virginia & Georgia Railroad and will no longer be known by its former name.

Springfield Southern.—Mr. C. E. Henderson has been appointed General Manager, and Mr. Ford Woods Superintendent, with offices at Springfield, O.

Texas & Pacific.—Mr. J. F. Sechler, late Master Mechanic of the Ohio & Mississippi railroad has accepted the same position on this road, with headquarters at Dallas, Tex.

Texas & Pacific.—Mr. H. H. Sessions is Master Car-Builder of this road, and also of the International & Great Northern.

Wabash, St Louis & Pacific.—This company having acquired the Havana, Rantoul & Eastern road (to be known as the Rantoul Division), Mr. T. B. Burnett has been appointed Division Superintendent, with office at Rantoul, Ill.

WANTED.—A position as master mechanic, or as foreman in a railroad machine or car shop. The applicant has had much experience in both capacities, and can give the best of reference. Address NATIONAL CAR BUILDER, 5 Dey street, New York.

"SPECIAL NOTICE TO ALL INTERESTED IN THE MANUFACTURE OF BOLTS."

U. S. Patent No. 146,374, dated Jan. 13, 1874, for bolt-forging machines, grants as one of the claims a link swinging past a center, to operate side hammers, or dies, twice in each revolution of the counter shafts, and I hereby give notice that Messrs. S. C. Forsaith & Co., of Manchester, N. H., are the only licensed builders in the United States to make and sell these machines, and I would caution all persons not to purchase bolt-forging machines having this motion of any one else under penalty of legal steps being taken to secure my rights.

JOHN R. ABBE, Inventor,
South Windham, Conn.

CONTINUOUS DRAW-BAR PATENTS.

The following circular has been issued by the Secretary of the Western Railroad Association:

CHICAGO, Sept. 9, 1880.

To the Members of the Association:

GENTLEMEN: Claims have been pending for several years that the Continuous Draw-Bar sold by the Continuous Draw-Bar Company under the Middleton and the Griffith and Patterson patents is an infringement of patent 71,580, granted 3d December, 1867 (reissue No. 8,095, granted 19th February, 1878), to Edward L. Caum.

This Association has continuously advised against entertaining this claim, but to quiet all questions, and at our instigation, the Continuous Draw-Bar Company has recently purchased the Caum patent, its owners inserting in the assignment a full and absolute release to all the members of the Eastern and Western Railroad Associations from any and all liability for, or on account of, any infringement heretofore of said patent.

Yours truly,
J. H. RAYMOND, Secretary, etc.

appointed Manager and A. W.
ent.

S. R. Callaway, late of Detroit
n appointed Superintendent of
office at Chicago.

A.—Mr. Tho. G. Gorman, Super-
, has resigned his position, to
locomotive and car works, at

.—Mr. James Long is appointed
e Power and Machinery and Car
G. Gorman, resigned.

. Wm. A. Field has been ap-
nic in place of Mr. E. Bolton,

sis.—Mr. A. H. Crocker has been
erintendent. He was recently
ton and Quincy.

—Mr. James Tobin has been ap-
nt.

& Western.—Mr. C. C. Waite
tant to the President. Mr. Waite
n connected with the Pittsburg,
road, and more recently as
iami Division.

land.—Mr. J. C. Rawn has been
t of the Western Division, in
esigned.

—Mr. J. F. Sechler, General
signed to take charge of the
hall, Texas. He is succeeded
n as Division Master Mechanic.

. Fillmore has been appointed
and Mr. James Welch Master
Portland, Oregon.

own.—Mr. George M. Patten
al Superintendent, succeeding
neral Manager. Mr. Patten was
entral.

—This road has been purchased
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by its former name.

—Mr. C. E. Henderson has
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R. ABBE, Inventor,
South Windham, Conn.

AW-BAR PATENTS.

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CHICAGO, Sept. 9, 1880.

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release to all the members of
road Associations from any and
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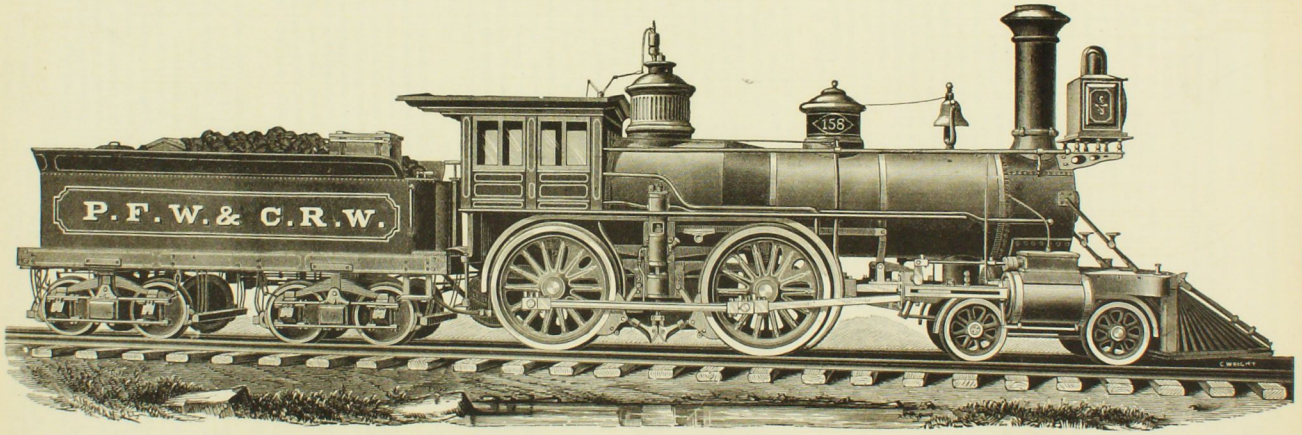
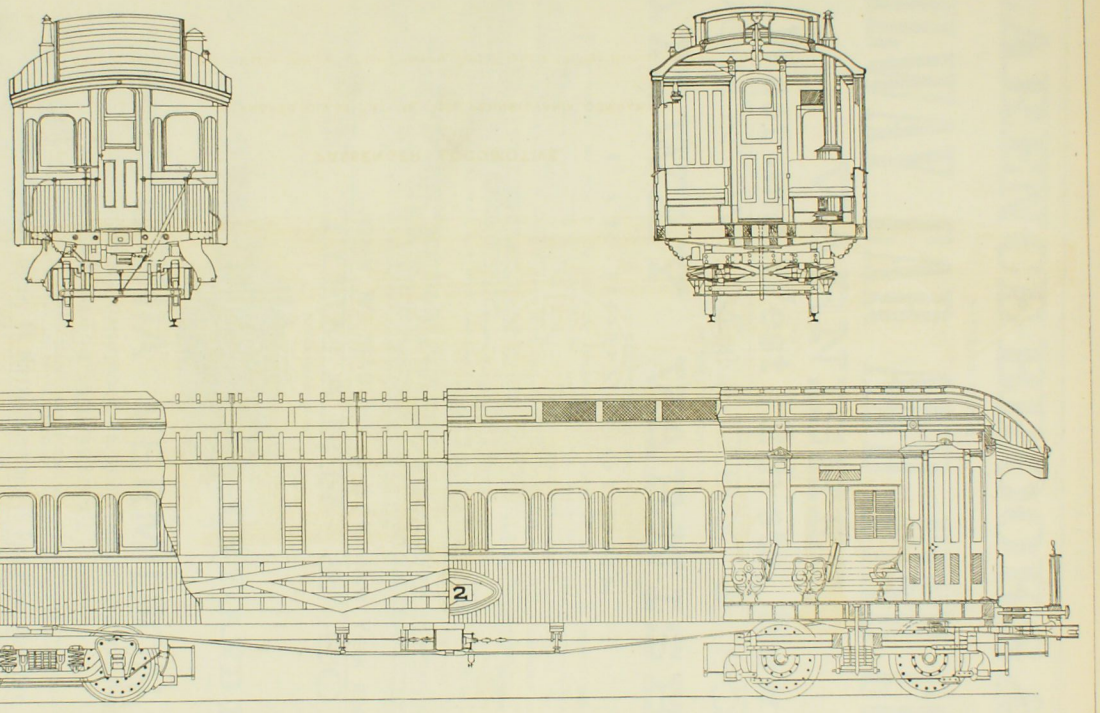
H. RAYMOND, Secretary, etc.



PASSENGER LOCOMOTIVE,

STANDARD CLASS "A" (No. 158), PENNSYLVANIA COMPANY.

Built by James M. Boon, Master Mechanic of the Pittsburg, Fort Wayne & Chicago Railway, at Fort Wayne, Ind.



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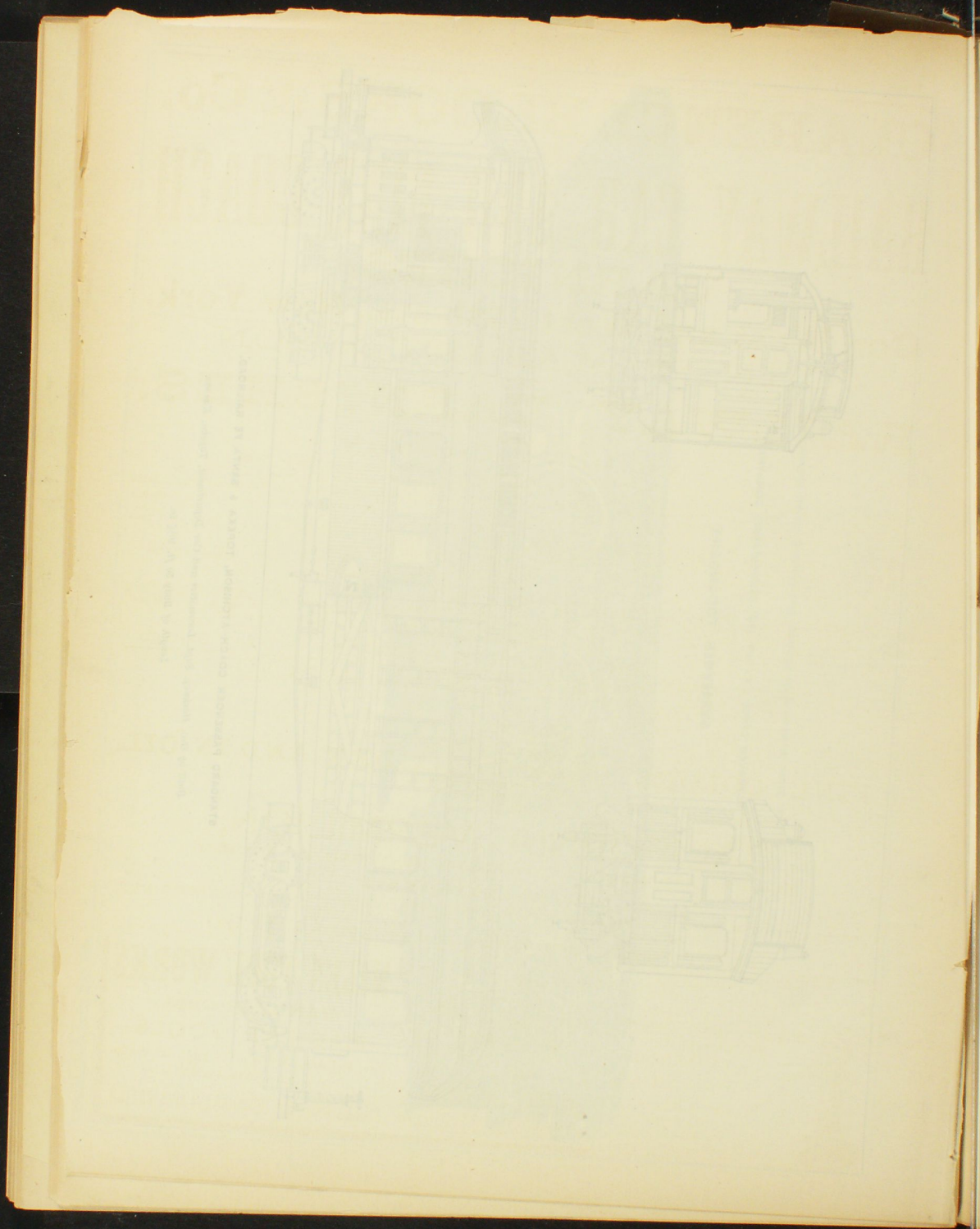

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BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
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PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
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GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
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BILLMEYER & SMALL MANUFACTURING CO., York, Pa. } Railroad Car Builders.
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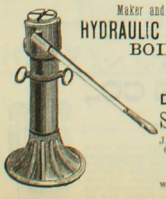

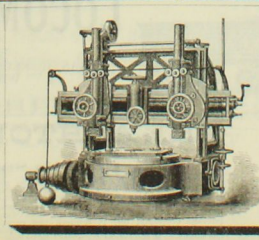

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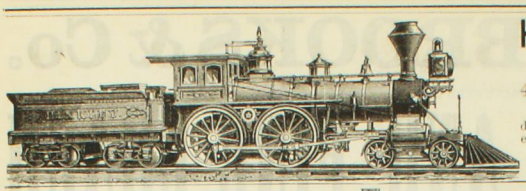

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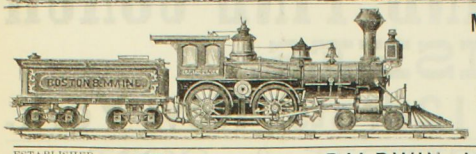

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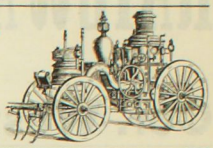

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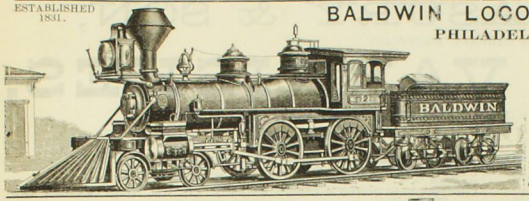

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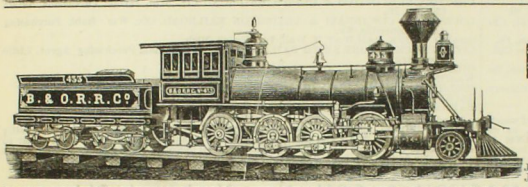

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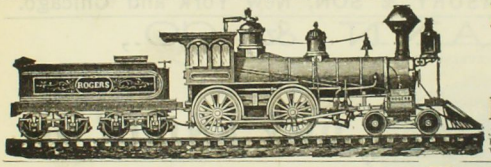

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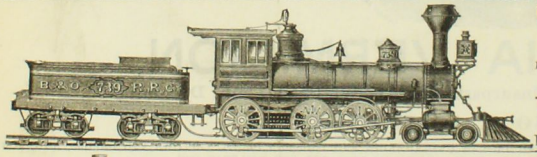

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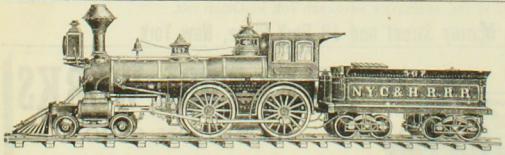

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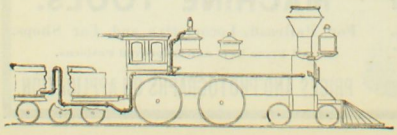

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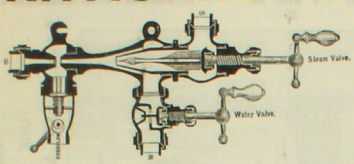

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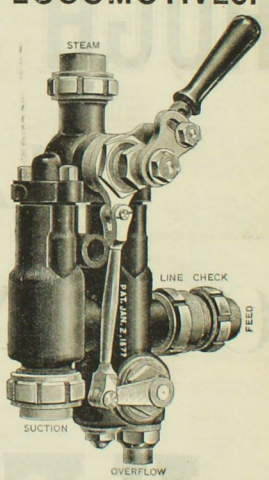

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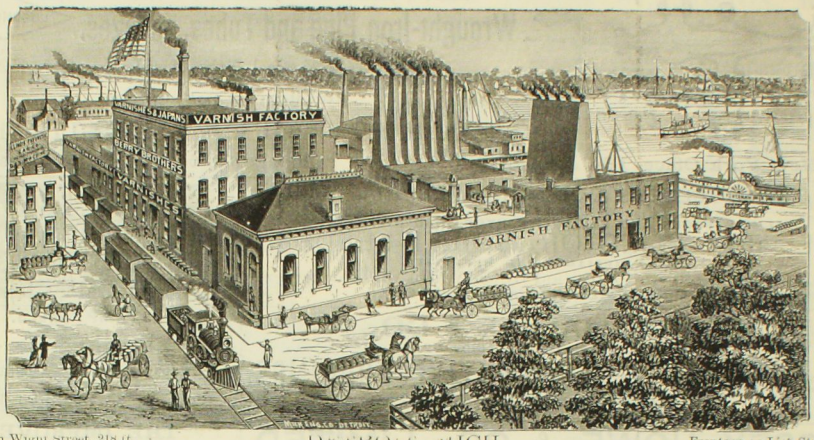

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Atchison, Topeka & Santa Fe	W. T. Allen		Las Vegas, N. M.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Atlanta & Charlotte Air-Line	C. D. Wall	C. D. Wall	Atlanta, Ga.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point		R. D. Cole	Newnan, Ga.
Atlantic & North Carolina	Basil Manly		New Berne, N. C.
Atlantic, Mississippi & Ohio			
Norfolk & Peter. Division	J. T. Robinett	J. T. Robinett	Petersburg, Va.
Virginia & Tenn. Division	F. Sterk	W. A. Morgan	Lynchburg, Va.
Atlantic & Pacific	§§G. B. Simonds		Albuquerque, N. M.
B			
Baltimore & Ohio	§John C. Davis	J. S. Shryack	Baltimore, Md.
Baltimore & Ohio	L. N. Kalbaugh	James H. Mill	Baltimore, Md.
Baltimore & Ohio	Wm. Edwards		Martinsburg, Va.
Baltimore & Ohio	Sam. Houston		Piedmont, Va.
Baltimore & Ohio	E. L. Weisgerber		Grafton, W. Va.
Baltimore & Ohio	Robert Maxwell		Cumberland, Md.
Baltimore & Ohio	Chas. Hirsch		Wheeling, W. Va.
Baltimore & Ohio	S. B. Crawford		Parkersb'rg, W. Va.
Central Ohio Division	O. B. Perkins		Zanesville, O.
Ohio & Chicago Division	§W. H. Harrison		Newark, O.
Central Ohio Division	James Stewart		Newark, O.
Central Ohio Division	H. M. Ingler		Bellaire, O.
Lake Erie Division	And. Bankert		Sandusky, O.
Chicago Division	W. Y. Johnston		Garrett, Ind.
Chicago Division	F. J. Gunther		Chicago Junc., O.
Chicago Division	Geo. Wilson		Kingston, Ill.
Pittsburg Division	§John E. Sampsel		Connellsville, Pa.
Baltimore & Potomac	§§R. H. Soule		Baltimore, Md.
Bath & Hammondsport	Allen Wood		Ham'ondsp't, N. Y.
Bedford, Springville, O. & Bloom'd	Capt. Geo. Elliott		Bedford, Ind.
Bellefonte & Snow-Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Bennington & Rutland	G. W. Blanchard		Rutland, Vt.
Boston & Albany	§§A. B. Underhill	J. B. Weston	Springfield, Mass.
Boston & Albany		††F. D. Adams	Allston, Mass.
Boston & Albany	T. B. Purvis	J. E. Doran	Greenbush, N. Y.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Barre & Gardner	Chas. F. Brigham		Worcester, Mass.
Boston, Concord & Montreal	§§Geo. A. Ferguson	L. D. Pickering	Lake Village, N. H.
Boston & Maine	Wm. Smith		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell	J. F. Crockett	J. F. Crockett	Boston, Mass.
Boston & New York Air-Line			New Haven, Conn.
Boston, Revere Beach & Lynn	J. L. Folsom	John Coghlan	Boston, Mass.
Brunswick & Albany			Brunswick, Ga.
Burlington & Missouri River in Neb.	D. Hawksworth	D. Hawksworth	Plattsmouth, Neb.
Burlington, Cedar Rapids & Nor.	R. W. Bushnell	R. W. Bushnell	Cedar Rapids, Ia.
Burlington & Southwestern		A. B. Allen	Farmington, Ia.
Buffalo & Southwestern	J. G. Hubbard		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Allen Vail		Buffalo, N. Y.
C			
Cairo & St. Louis	**Geo. W. Prescott	Geo. W. Prescott	E. Carondelet, Ill
Cairo & Vincennes	A. Van Tuyl	A. Van Tuyl	Carroll, Ill.
California, Pacific & Northern	D. Rutherford	D. Rutherford	So. Vallejo, Cal.
Camden & Atlantic	Rufus Hill	S. Wills	Camden, N. J.
Canada Central	†T. Irwin		Brockville, Can.
Canada Southern and Branches	*John Ortton	††John Ortton	St. Thomas, Ont.
Canada Division	‡W. A. Short	Robert Potts	St. Thomas, Ont.
U. S. Division	O. P. Dunbar		Grosse Isle, Mich.
Carolina Central	§Jas. Maglenn	S. R. Ethridge	Laurinburg, N. C.
Catasauqua & Fogiesville	Tho. E. Evans	Chas. J. Holbach	Catasauqua, Pa.
Central of Georgia	D. D. Arden	R. M. Barthlemas	Savannah, Ga.
Atlanta Division	D. M. Gugel	Jas. A. Knight	Macon, Ga.
Central of New Jersey	Wm. Woodcock	George Hackett	Elizabeth, N. J.
Lehigh & Susquehanna Div.	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Central of Iowa	M. C. Wheeler	T. L. Seevers	Marshalltown, Ia.
Central Pacific	‡A. J. Stevens	††Benj. Welch	Sacramento, Cal.
Central Pacific		‖G. J. Turner	Sacramento, Cal.
Western Division	Geo. D. Welch	W. B. Ludlow	Oakland, Cal.
Visalia Division	S. Johnson		Tulare, Cal.
Sacramento & Oregon Div.	M. W. Cooley	Phil. Douglass	Sacramento, Cal.
Truckee Division	Geo. Gregg	Wm. McPherson	Wadsworth, Nev.
Humboldt Division	W. F. Smith	J. C. Doughty	Carlin, Nev.
Salt Lake Division	Jas. Lamb		Terrace, Utah.
Salt Lake Division		‖A. Sherburne	Ogden, Utah.
Central Vermont	§§J. M. Foss		St. Albans, Vt.
New London & Northern Div.	J. W. Row	S. O. Banks	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chesapeake & Ohio	§John McFarland	J. N. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Sassinger	Huntingdon, W. Va.
Cheraw & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cherokee	C. E. Scruton		Cedartown, Ga.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta		J. C. Troeger	Columbia, S. C.
Charleston & Savannah	H. A. Ulmo	J. D. Murphy	Charleston, S. C.
Chicago & Atlantic	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	** Geo. W. Tilton	††William Campbell	Chicago, Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. White		Escanaba, Mich.
Winona & St. Peters Div.	W. A. Scott	W. A. Scott	Winona, Minn.
Chicago & Alton	§§Wm. Wilson		Bloomington, Ill.
Kansas City & St. Louis Div.	J. T. Todd		Mexico, Mo.
Chicago, Burlington & Quincy	§§H. B. Stone	*J. Chistiansen	Aurora, Ill.
Chicago Division	W. D. Rowley		Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckerson		Creston, Ia.
St. Louis Division	L. E. Johnson		Beardstown, Ill.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Chicago, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	R. Biester		Chicago, Ill.
Chicago, Rock Island & Pacific	Jas. E. Morrill		Davenport, Ia.
Chicago, Rock Island & Pacific	†T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Keokuk & Des Moines Div.	S. W. Wakefield	Henry Kummer	Keokuk, Iowa.
Southwestern Division	R. O. Carscadin		Trenton, Mo.
Iowa Division	G. Crockett		Stuart, Ia.
Chicago & West Michigan	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Jas. T. Kerney	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.
Chicago, Milwaukee & St. Paul	J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du. Ch. Div		John Bailie	Milwaukee, Wis.
Northern Division		Wm. E. Kittredge	Milwaukee, Wis.
Iowa & Minn. Division	J. O. Pattie		Minneapolis, Minn.
Racine & S. West Div	John Taylor	E. A. Eddy	Racine, Wis.
Sioux City & Dak. Div	J. H. Moulton		Yankton, Dak.
Southern Minnesota Div			Hokah, Minn.
Chicago & Paducah	T. J. Grosh	T. J. Grosh	Streator, Ill.
Chicago, Pekin & Southwestern	A. R. Overton		Joliet, Ill.
Chicago, Pekin & Southwestern		F. Shields	Streator, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	E. D. Anderson		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	J. M. Keith		Jackson, Tenn.
Chicago, St. Louis & New Orleans	J. F. White		Water Valley, Miss.
Chicago, St. Paul, Minn. & Omaha	Matt Ellis		Shakopee, Minn.
Chicago, St. Paul, Minn & Omaha		J. R. Reniff	Sioux City, Ia.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker	Wabash, Ind.
Cincinnati, Hamilton & Dayton	James Eckford	W. H. H. Allison	Cincinnati, O.
Cin., Ind., St. Louis & Chicago	J. S. Patterson	J. S. Patterson	Cincinnati, O.
Cincinnati, Richmond & Chicago	Wesley S. Brewer		Richmond, Ind.
Cin. Rockport & So. Western	B. W. Smith	J. H. Bauman	Rockport, Ind.
Cincinnati Southern	J. Ivanson		Lindale, Ky.
Cleve., Col., Cin. & Indianapolis	‡W. F. Turef	Wm. Ball	Clevela'd, O.
Indianapolis Division	A. R. McAlpine		Brightwood, Ind.
Columbus & Cin. Division	W. L. Gilmore	A. G. Steinbrunner	Clevelan'd, O.
Cleveland & Marietta	Tho. Robertson	Tho. Robertson	Marietta, Ohio.
Cleveland & Pittsburg	§N. E. Chapman	N. E. Chapman	Clevela'd, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway	Akron, O.
Cleve., Tusc. Valley & Wheeling	Tho. Ranson		Lorain, O.
Cobourg, Peterboro & Marmora	Wm. Polson		Cobourg, Canada.
Columbia & Greenville	W. J. Parrish		Helena, S. C.
Columbus & Hocking Valley	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Columbus & Toledo	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Concord	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Claremont	**J. N. Lauder		Concord, N. H.
Connecticut River	§Wm. H. Stearns		Springfield, Mass.
Connecticut Valley	S. E. Brewer	S. E. Brewer	Hartford, Conn.
Connecticut Western	John C. Barton		Hartford, Conn.
Conn. & Passumpsic Rivers	L. L. Brigham	L. F. Woodard	Lyndonville, Vt.
Corning, Cowanesque & Antrim	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Cumberland Valley	A. S. Hull	G. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	N. W. Howson	Nathan Binnix	Mt. Savage, Md.
D			
Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton	Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George	Danbury, Conn.
Danville & Southwestern	B. L. Baldwin		Danville, Ill.
Danville, Olney & Ohio River	Louis Parisoe		Kansas, Ill.
Davenport & Northwestern	H. E. Woods		Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon	Dayton, O.
Dayton & Southeastern	F. M. Mast		Dayton, O.
Dayton & Michigan	John Black		Lima, O.
Delaware, Lackawanna & West.	Walter Dawson	Robert McKenna	Scranton, Pa.
Morris & Essex Division	W. H. Lewis		Kingsland, N. J.
Morris & Essex Division		J. W. Baker	Dover, N. J.
Oswego & Syracuse Division	James Buchanan		Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher		Utica, N. Y.
Bloomsburg Division	Charles Graham		Kingston, Pa.
Delaware & Chesapeake	Jos. A. Baynard		Easton, Md.
Delaware & Hudson Canal Co	**R. C. Blackall		Albany, N. Y.
Delaware & Hudson Canal Co		T. Orchard	Carbondale, Pa.
Rensselaer & Saratoga Div.	J. L. Corey	Chr. Körner	Green Island, N. Y.
Denver Pacific	§R. McDougall	John Clock	Denver, Col.
Denver & Rio Grande	N. W. Sample	N. W. Sample	Denver, Col.
Des Moines & Fort Dodge	John McGravel	E. A. Avery	Grand Junction, Ia.
Detroit & Bay City	R. P. Baillie		Bay City, Mich.
Detroit, Grand Haven & Mil	Fred Parker		Detroit, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous	Ionia, Mich.
Dorchester & Delaware			Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	J. C. Haggett	J. C. Haggett	Dunkirk, N. Y.
E			
East Broad Top	W. C. Maynes		Orbisonia, Pa.
Eastern	§§Amos Pilsbury	J. D. Billings	Salem, Mass.
Eastern	‖D. S. Wallis		East Boston, Mass.
Eastern Kentucky	D. L. Weaver	D. L. Weaver	Riverton, Ky.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster	Knoxville, Tenn.
Selma Division	B. J. Sitton	W. W. Pierce	Selma, Ala.
Erie & Pittsburg	J. A. Wood	J. A. Wood	Erie, Pa.
Eureka & Palisade	M. Alson	M. Alson	Eureka, Nev.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey	Mattawamk'g, Me.
Evansville & Terre Haute	John L. White	Joseph Stiker	Evansville, Ind.
F			
Fitchburg	§§Geo. A. Cooledge	J. W. Marden	Charlestown, Mass.
Vermont & Mass. Div.	W. A. Foster		Fitchburg, Mass.
Flint & Pere Marquette	T. J. Hatswell	T. J. Hatswell	E. Saginaw, Mich.
Florida Central	James S. McElroy	James S. McElroy	Jacksonville, Fla.
Flushing, North Shore & Central	Thomas Meehan	Edward Riley	L. I. City, N. Y.
Fort Wayne & Jackson	C. W. Hollister		Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	Wm. McPhail	Wm. McPhail	Fort Wayne, Ind.
G			
Galv., Harrisburg & San Antonio	§§D. T. Davis	Jas. Alexander	Harrisburg, Tex.
Galveston, Houston & Henderson	J. G. Conlon		Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver		Waverly, N. Y.
Georgia	John S. Cook	T. M. Preval	Augusta, Ga.
Grand Haven	R. Booth	R. Booth	Muskegon, Mich.
Grand Tower & Carbondale	Hugh Smith	Hugh Smith	Grand Tower, Ill.
Grand Trunk	†Herbert Wallis	Wm. McWood	Montreal, Canada.
Grand Trunk		Warren Noyes	Gorham, N. H.
Grand Trunk		Duncan Menish	Portland, Me.
Chicago Division	†K. Blackwell		Battle Creek, Mich.
Grand Rapids & Indiana	J. M. Boon		Fort Wayne, Ind.
Grand Rapids & Indiana	‖J. R. Fish	‖J. R. Fish	Grand Rapids, Mich.
Grayville & Mattoon	C. H. Cory		Mattoon, Ill.
Great Western, of Canada	†C. K. Donnville		Hamilton, Can.
Great Western, of Canada	C. F. Hanson	Henry Childs	London, Ont.
Green Bay & Minnesota	Edw. Osborne		Green Bay, Wis.
Gulf, Colorado & Santa Fe	Geo. B. Nicols	W. H. Martin	Galveston, Texas.
Gulf, Western Texas & Pacific	James Mooney		Cuero, Texas.
H			
Hanover Junction & Gettysburg	John J. Bingley	John J. Bingley	Hanover, Pa.
Hannibal & St. Joseph	Jas Long		Hannibal, Mo.
Housatonic	N. Slingland	J. J. Ferris	Falls Village, Conn.
Houston, East & West Texas	J. E. Wiggin		Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee	Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla		Saxton, Pa.
I			
Illinois Central	**S. J. Hayes	W. B. Snow	Chicago, Ill.
Chicago Division	Henry Schlacks		Chicago, Ill.
South Division	David Oxley		Centralia, Ill.
North Division	J. B. Edams		Amboy, Ill.
Iowa Division	Thomas W. Place		Waterloo, Ia.
Springfield Division	W. B. McKenna		Clinton, Ill.
Illinois Midland	R. M. Pringle		Paris, Ill.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Illinois & St. Louis	J. H. Smith		Belleville, Ill.
Illinois & St. Louis		Charles Rothe	E. St. Louis, Ill.
Indianapolis Decatur & Springfield	Pulaski Leeds	Pulaski Leeds	Indianapolis, Ind
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Indianapolis & St. Louis	A. J. Sanborn	Geo. H. Pratt	Mattoon, Ill.
Indiana, Bloomington & Western	C. A. Thompson	C. A. Thompson	Urbana, Ill.
Ohio Division	Jos. L. Porter		Sandusky, Ohio.
International & Great Northern	R. H. Johnson	H. H. Sessions	Palestine, Tex.
Intercolonial	†H. A. Whitney	Edw. Shaffer	Moncton, N. B.
Iron	Perry Scott	Clem. Roetling	Ironton, O.
J			
Jacksonville, Pensacola & Mobile	Jas. D. Hollister		Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swanston	Edw. Austin	Jeffersonville, Ind.
Jacksonville, N. West. & S. East	B. J. Miller		Jacksonville, Ill.
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Maguire		Lewes, Del.
K			
Kansas City, Fort Scott & Gulf	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kan. City, St. Jo. & Coun. Bluff	F. A. Chase	Thos. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kansas Pacific	**John MacKenzie	T. B. Roberts	Armstrong, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John B. Daily		Ellis, Kan.
Denver Division	R. McDougal	Wm. Ogle	Denver, Col.
Kentucky Central	J. R. Ledyard	J. L. Hackathorn	Covington, Ky.
Knox & Lincoln	Wm. A. Field	C. L. Turner	Bath, Me.
L			
Lake Erie & Western	*H. L. Cooper		Lima, Ohio.
Lake Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Lake Shore & Michigan Southern	‡James Sedgley	††John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
" " "		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withycombe	Cleveland, Ohio.
Buffalo Division	J. S. Graham	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. Clark		Hazleton, Pa.
Lehigh Valley	A. Mitchell		Wilkesbarre, Pa.
Lehigh Valley		Jno. S. Lentz	Packerton, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	Joseph Taylor	Joseph Taylor	Arkans's City, Ark.
Los Angeles & Independence	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Louisville, New Albany & Chicago	Geo. H. Ruhlandt	Geo. H. Ruhlandt	New Albany, Ind.
Long Island	Jas. Thompson	Jas. Thompson	L. Isl'd City, N. Y.
Louisiana Western	B. B. Harrop		Vermilionville, La.
Louisville, Cincinnati & Lexing'n	A. Schaeffer	A. Schaeffer	Louisville, Ky.
Louisville & Nashville	**Reuben Wells	H. Middleton	Louisville, Ky.
Nashville & Decatur Div	W. H. Thomas	J. P. Furguson	Nashville, Tenn.
South & North Ala. Div	C. W. White		Birmingham, Ala.
St. Louis Div	Thos. Walsh	W. H. H. Price	Mt. Vernon, Ill.
Clarksville Division			Bowling Green, Ky.
Memphis & Ohio Div	Wm. Pike		Memphis, Tenn.
Mobile & New Orleans Div	Wm. Adair		Mobile, Ala.
M			
Macon & Brunswick	R. Wagnon	R. Wagnon	Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Beach			Bay Ridge, L. I.
Manhattan Elevated	T. W. Peeples	H. A. Webster	New York, N. Y.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Tho. Rennell	P. Twitchell	Argenta, Ark.
Memphis & Charleston	§H. N. Burford	J. J. Kasey	Memphis, Tenn.
Mexican National	J. C. Munro		City of Mexico.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Midland of New Jersey	W. C. Ennis		Wortendyke, N. J.
Milwaukee, Lake Shore & West'n	S. Charnley		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Point	Robert Hay	Robert Hay	Mineral Pt., Wis.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	J. C. Ramsey	S. J. Bolton	Memphis, Tenn.
Missouri & Western	A. C. Persing		Pierce City, Mo.
Missouri Pacific	§§John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Grant		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Missouri Pacific	H. V. Faries		Atchison, Kan.
Mobile & Montgomery	C. W. White	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C. Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.
N			
Nashua & Lowell	S. A. Davis	S. A. Davis	Nashua, N. H.
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
Naugatuck	Henry Hanford	George W. Gray	Bridgeport, Ct.
Nebraska	D. Hawksworth		Plattsmouth, Neb.
Nevada Central	Wm. Sutcliffe		Battle Mountain, Nev.
Newburg, Dutchess & Connecticut	W. G. Vanbuskirk		Dutchess J'n, N. Y.
New Brunswick	Jesse Mathews	T. N. Burpee	Gibson, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	St. Andrew's, N. B.
New Haven & Northampton	Henry Fox	John Sweeny	New Haven, Ct.
New Jersey & New York	J. S. Drake		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		Manchester, N. J.
New York, Lake Erie & Western	§§F. M. Wilder		Susquehanna, Pa.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western		J. N. Mileham	Jersey City, N. J.
New York, Lake Erie & Western	J. Van Vechten	J. Van Vechten	Port Jervis, N. Y.
New York, Lake Erie & Western	V. Blackburn		Susquehanna, Pa.
New York, Lake Erie & Western		D. B. Goodell	Elmira, N. Y.
New York, Lake Erie & Western	George H. Griggs		Hornellsville, N. Y.
New York, Lake Erie & Western	G. B. Ross	M. Wilder	E. Buffalo, N. Y.
New York, Lake Erie & Western	Jos. Bradt		Rochester, N. Y.
New York & Harlem	Theo. Wheeler		New York, N. Y.
New York & Harlem		C. E. Garey	Morrisania, N. Y.
New York Central & Hud. River	§§Wm. Buchanan	††Leander Garey	New York, N. Y.
New York Central Division	§§G. B. Van Vorst	D. Holt	West Albany, N. Y.
New York Central Division	§§Henry Watkeys		Syracuse, N. Y.
New York Central Division	§§Amos Gould	E. A. Olmstead	E. Buffalo, N. Y.
New York Central Division	§§S. L. White	Richard Donaby	Niagara Falls, N. Y.
Hudson River Division	§§Wm. Buchanan	Peter Smith	New York, N. Y.
New York Central Division		C. H. Burchard	E. Rochester, N. Y.
New York, Ontario & Western	Edw. Minshull	Edw. Minshull	Middletown, N. Y.
New York & New England	§§Geo. E. Boyden	Elias E. Pratt	Boston, Mass.
Norwich & Worcester Div	Richard Colburn		Norwich, Ct.
Hartford Division	E. M. Humstone	S. Howland	Hartford, Conn.
New York, N. Haven & Hartford			
New York & New Haven Div	§§H. Kettendorf	James Denver	New Haven, Conn.
Hartford Division	§§Jno. Henney, Jr.	John Henney, Jr.	Hartford, Ct.
New York, Penn. & Ohio	‡William Fuller	††Wm. Fuller	Cleveland, O.
New York, Penn. & Ohio	J. A. Cooper	D. S. Dockstader	Meadville, Pa.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
New York, Penn. & Ohio	N. Wright	W. G. Huggard	Cleveland, O.
New York, Penn. & Ohio		S. V. Smith	Kent, O.
New York, Penn. & Ohio	William Hill	J. W. Holmes	Galion, O.
New York, Penn. & Ohio		J. T. Fosdick	Salamanca, N. Y.
New York, Penn. & Ohio		Geo. Wilson	Dayton, O.
New York, Providence & Boston	J. H. Anderson	J. H. Anderson	Providence, R. I.
Northern Central	§§R. H. Soule	G. W. Demarest	Baltimore, Md.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	J. C. Dyott	Elmira, N. Y.
Northern New Hampshire	**Jas. N. Lauder		Concord, N. H.
Northern of Canada	Peter Clark	Peter Clark	Toronto, Can.
Northern Pacific	**A. P. Farrar	A. P. Farrar	Brainerd, Minn.
Dakota Division	A. Rupert		Fargo, Dak.
Pacific & P. Oreille Div	C. Z. Sanders	Tho. G. Davis	New Tacoma, W. T.
Northeastern		W. H. Day	Florence, S. C.
North Pacific Coast	James Walch		Saucelito, Cal.
Northern & Northwestern	P. Clark		Toronto, Can.
O			
Ogdensburg & Lake Champlain	Abraham Klohs	A. Klohs	Malone, N. Y.
Ohio Central	J. B. Morgan		Bucyrus, O.
Ohio & Mississippi	A. Donaldson		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Aurora, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
Springfield Division	W. H. Reilly		Pana, Ill.
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
B. C. F. & N. Bedford Div	Geo. W. Reynolds	Sam. Stevens	Taunton, Mass.
Olean, Bradford & Warren	Chas. Turner	Chas. Turner	Olean, N. Y.
Oregon & California	§§J. Brandt		Portland, Oregon.
Oregonian	Jas. Walch		Portland, Oregon.
Oregon Railway & Navigation Co.	J. F. Curtis	Chas. Phipps	The Dalles, Oregon
P			
Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	J. H. Jones		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C.
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	§§T. N. Ely		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
New Jersey Division	L. A. Bosdevex	E. F. Bosdevex	Meadow Shops, N. J.
New Jersey Division		David H. Baker	Jersey City, N. J.
New Jersey Division	§§H. S. Hayward		Jersey City, N. J.
New Jersey Division	Tho. Kerr	P. S. Bogart	So. Amboy, N. J.
New Jersey Division	R. McDowell		Lambertville, N. J.
New Jersey Division	W. McAllister		Camden, N. J.
West Penn. Division	C. B. Street	M. H. Falls	Blairsville, Pa.
Peoria, Decatur & Evansville	P. Reilly		Mattoon, Ill.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peoria & Springfield	I. Blovelt	J. G. Evans	Peoria, Ill.
Petersburg	R. B. Andrew	J. W. Fleming	Petersburg, Va.
Philadelphia, Wilmington & Balt	S. A. Hodgman	Wm. Lungren	Wilmington, Del.
Philadelphia & Atlantic City	J. W. Wright	E. Lippincott	Camden, N. J.
Philadelphia & Erie	§§Howard Fry		Williamsport, Pa.
	W. F. Beardsley		Sunbury, Pa.
	W. L. Forster		Renovo, Pa.
	W. T. Smith		Erie, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	S. D. Danfield	Chester, Pa.
Philadelphia & Reading	*L. B. Paxson	John H. Rankin	Reading, Pa.
Philadelphia & Reading	Jackson Richards		Philadelphia, Pa.
Catawissa Branch	W. H. Ellis	C. D. Ellis	Catawissa, Pa.
Piedmont Air Line	‡R. D. Wade		Richmond, Va.
Rich. & Danville Div		J. B. Vaughan	Richmond, Va.
North Carolina Div		J. C. Holt	Comp. Shops, N. C.
Pittsburg, Cincinnati & St. Louis	§§G. W. Rhodes		Columbus, O.
Little Miami Division	J. H. Setchel	John McVay	Cincinnati, O.
Little Miami Division		M. P. Ford	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	Tho. Chamberlin	Columbus, O.
Col., Cin. & Ind. Div	Geo. H. Prescott	Chas. H. Starr	Logansport, Ind.
Col. Cin. & Ind. Division	C. M. St. Clair		Indianapolis, Ind.
Cin. & Musk. Val. Division	Leroy Kells	Daniel Jewell	Lancaster, O.
Pitts. Cin. & St. Louis Divis'n	Ross Kells		Pennison, O.
Pitts. Cin. & St. Louis Divis'n		A. K. Mansfield	Steubenville, O.
Pittsburg, Fort Wayne & Chicago	Geo. J. Parkin	John Marquis	Allegheny, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Israel Lee	Fort Wayne, Ind.
Pittsburg, Fort Wayne & Chicago	Geo. W. Lowe	J. J. Kirkland	Crestline, O.
Pittsburg, Titusville & Buffalo	H. J. Bookhammer	John Monks	Oil City, Pa.
Pittsburg, Virginia & Charleston	Wm. Lininger		Pittsburg, Pa.
Pittsburg & Western	D. C. Courtney		Zelienople, Pa.
Pittsburg & Lake Erie	S. W. Haines		Pittsburg, Pa.
Portland & Ogdensburg	Geo. H. Poor	W. G. Brewer	Portland, Me.
Portland & Rochester	E. H. C. Tompson	David Dow	Portland, Me.
Port Dover & Lake Huron	H. M. Aldrich		Woodstock, Ont.
Port Royal & Augusta	Geo. Riley	J. H. Milton	Port Royal, S. C.
Poughkeepsie, Hartford & Boston	John L. Driscoll		Poughkeepsie, N. Y.
Prince Edward Island	A. Stronach	D. M. Fraser	Charlottet'n, P. E. I.
Providence & Springfield	G. T. Richardson		Pascoag, R. I.
Providence & Worcester	A. Griggs	A. Griggs	Providence, R. I.
Providence, Warren & Bristol	Rufus Smith	Rufus Smith	Bristol, R. I.
Q			
Quebec, Mont., Ottawa & Occidental	†A. Davis		Montreal, Can.
Quincy, Missouri & Pacific			Kirksville, Me.
R			
Raleigh & Augusta Air-Line	**B. R. Harding		Raleigh, N. C.
Raleigh & Gaston	**B. R. Harding	R. T. Bishop	Raleigh, N. C.
Rhinebeck & Connecticut	John Dykeman	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Allegheny	Geo. D. Harris		Richmond, Va.
Richmond & Danville	See Piedmont Air-Line.		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Rich., York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Markwood	Brownsville, Tex.
Rochester & Pittsburg	J. P. Hovey		Rochester, N. Y.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Geo. H. Haselton	Geo. H. Haselton	Oswego, N. Y.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
S			
Saginaw Valley & St. Louis			St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	John Martin	Donahue, Cal.
Savannah, Florida & Western	§Chas. Collins	P. N. Raynal	Savannah, Ga.
Savannah & Memphis	R. A. Bridges		Opelika, Ala.
Scioto Valley	C. H. Cory	C. H. Cory	Portsmouth, O.
Seaboard & Roanoke	§§M. M. Pendleton		Portsmouth, Va.
Selma, Marion & Memphis	J. M. Levis		Marion, Ala.
Sheboygan & Fond du Lac	John Hickey	John Hickey	Sheboygan, Wis.
Shenango & Allegheny	Edw. Richardson		Greenville, Pa.
Shepaug	C. M. Allen		Litchfield, Ct.
Sioux City & Pacific	C. H. Foster	C. H. Foster	Missouri Valley, Ia.
Sioux City & St. Paul	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Southern Pacific			
Northern Division	J. T. Wilson	F. N. Bellisle	San Francisco, Cal.
Los Angeles & Yuma Div	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Tulare Division	S. Johnson		Tulare, Cal.
South Carolina	§P. J. Cochrane	Geo. H. Gramling	Charleston, S. C.
Southern Central	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southeastern (Canada)	A. G. Eastman		Richford, Vt.
Southwestern of Georgia	D. M. Gugel	James A. Knight	Macon, Ga.
South Pacific Coast	E. L. Reese	E. L. Reese	Newark, Cal.

Railroad.	Master Mechanic.	Master Car Builder.	Residence.
Spartanburg, Union & Columbia	Wm. Platt	W. R. Brown	Spartanburg, S. C.
Springfield, Athol & Northeastern	W. E. Granger		Springfield, Mass.
Sortingfield Southern	F. W. Johnstone		Soringfield, O.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopolis	John M. Fulton		Stockton, Cal.
St. Croix & Penobscot	G. H. Corsen	H. C. Tincker	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Johnsbury & Lake Champlain	Geo. E. Howe		St. Johnsbury, Vt.
S. Joseph & Des Moines	F. A. Chase		St. Joseph, Mo.
St. Joseph & Western	E. Sleppy	E. Sleppy	So. St. Joseph, Mo
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & So	**O. A. Haynes	Oscar Doolittle	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris	H. M. Aldrich	De Soto, Mo.
St. Louis, Alton & Terre Haute	**Beriah Warren		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney	M. Kearney	N. Springfield, Mo
St. Louis, Keokuk & Northwest'n	Wm. Foley		Keokuk, Iowa.
St. Louis Bridge Co. & Tunnel R.R.	H. M. Smith		St. Louis, Mo.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	A. A. Ackerly		St. Paul, Minn.
St. Paul & Sioux City	Matt Ellis		Shakopee, Minn.
Sussex	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. Wes.	Wm. J. McMichael	Syracuse, N. Y.

T

Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
T. H. & Indianapolis / Vandalia / Indianapolis Div. / Line.	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
	Clinton Idler		Indianapolis, Ind
Vandalia Div.	Chas. Butler		Effingham, Ill.
Logansport Division	A. W. Quackenbush		Logansport, Ind.
Texas & New Orleans	D. C. Smith	J. M. Mather	Houston, Texas.
Texas & Pacific	H. J. Small	H. H. Sessions	Marshall, Texas.
Brazos Division	J. F. Sechler		Dallas, Tex.
Tioga	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	F. M. Mast		Delphos, O.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggas		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.

U

Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.
Union Pacific	‡‡H. Congdon	‡‡Geo. E. Stevens	Omaha, Neb.
Eastern Division		A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb.
Mountain & Laramie Div.	T. A. Davis	John E. Davis	Cheyenne, Wg. T.
Western Division		R. V. Brinkley	Evanston, Wg. T.
Colorado Division	James S. Scott	E. G. Thomas	Gold n, Col.
Denver, S. Park & Pacific Div.	J. H. Kirk		Denver, Col.
Kansas Division	**John MacKenzie	J. B. Roberts	Kansas City, Mo.
Kansas Division	J. B. Daily		Ellis, Kan.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utah Western	Robert Anderson		Salt Lake City, U.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Geo. W. Cleveland	F. W. Magargil	Breesport, N. Y.

V

Valley	B. C. Eosworth	Chas. Blanchard	Cleveland, O.
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	W. Bell Smith	W. Bell Smith	Monroe, La.
Virginia & Truckee	I. N. Fording		Carson, Nev.
Virginia Midland	J. E. Waddey	J. T. Nallo	Alexandria, Va.

W

Wabash, St. Louis & Pacific	Chauncy R. Morris		Fort Wayne, Ind
Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wabash, St. Louis & Pacific		J. S. Hazen	Stanbery, Mo.
Wabash, St. Louis & Pacific	W. H. Selby	C. S. Buck	Moberly, Mo.
Wallkill Valley	John Dykeman	Jno. H. Decker	Rondout, N. Y.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Pay	St. Catharine, C.W.
Westchester & Philadelphia	§S. D. Danfield	S. D. Danfield	Chester, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	§David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N. C.
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	Wm. McKelvey	Laurel Hill, La.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Weldon	John Bisset	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	§§J. B. Henney	J. B. Henney	Stevens' Pt, Wis.
Wisconsin Valley	** B. Snyder		Tomah, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

IN THE

PATENT FIGHT

BETWEEN

D. A. HOPKINS, of 113 Liberty St., N. Y.

PATENTEE AND MANUFACTURER OF

SELF-FITTING JOURNAL BEARINGS

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Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* General Manager. † General Superintendent. ‡ Assistant General Superintendent. § Assistant Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.

A

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Central	John M. Bridges		Selma, Ala.
Alabama Great Southern	*John Scott	R. W. Healey	Chattanooga, Tenn.
Alabama Great Southern	Chas. B. Wallace		Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Alleghany Valley	David McCargo	David McCargo	Pittsburg, Pa.
Arkansas Midland	Jas. A. Larnerd		Anderson, Ind.
Asheville & Spartanburg	*A. H. Johnson		Helena, Ark.
Ashtabula & Pittsburg	James Anderson		Spartanburg, S. C.
Atchison, Topeka & Santa Fe	*W. B. Strong	F. M. Smith	Ashtabula, O.
Southern Division	A. A. Robinson		Topeka, Kan.
Eastern Division	D. J. Chase		Las Vegas, N. M.
Atlanta & Charlotte Air Line	*G. J. Forseacre	G. J. Forseacre	Topeka, Kan.
Atlanta & West Point	*L. P. Grant		Atlanta, Ga.
Atlantic & North Carolina	A. B. Andrews		Atlanta, Ga.
Atlantic & Pacific	F. W. Smith		Newbern, N. C.
Atlantic & Pacific			Albuquerque, N.M.
Atlantic, Mississippi & Ohio	Geo. Hoffman	H. C. Nutt	Spartanburg, S. C.
Atlantic, Tennessee & Ohio	J. J. Gormley	J. P. Minetree	Chicago, Ill.
			Petersburg, Va.

B

Baltimore & Ohio	**W. M. Clements	N. S. Hill	Charlotte, N. C.
Ohio & Chicago Division	W. C. Quincy		Baltimore, Md.
Pittsburg Division	Thos. M. King		Newark, O
Bangor & Piscataquis	Arthur Brown		Pittsburg, O.
Bath & Hammondsport	M. H. Hall		Bangor, Me.
Bedford, Sp'gville, Owensb'g & Rd.	Jas. W. Kennedy	Jas. W. Kennedy	Hamm'dsp't, N. Y.
Bellefonte & Snow Shoe	Daniel Rhoads		Bedford, Ind
Bell's Gap	Robert G. Ford		Bellefonte, Pa.
Belt R. R. & Stock Yard	*M. A. Downing	M. A. Downing	Bellwood, Pa.
Bennington & Rutland	F. C. White	F. C. White	Indianapolis, Ind
Blairstown	J. D. Vail		Rutland, Vt
Boston, Revere Beach & Lynn	E. H. Rhorf	H. C. Nutt	Blairstown, N. J.
Boston & Albany	*Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Boston, Mass.
Boston & New York Air Line	Jos. H. Franklin		Springfield, Mass.
Boston & Providence	A. A. Folsom	A. A. Folsom	New Haven, Conn.
Boston, Concord & Montreal	*J. A. Dodge		Boston, Mass.
Boston, Concord & Montreal	*W. A. Stowell	J. Thomas Vose	Plymouth, N. H
Boston, Hoosac Tunnel & Western	E. B. Burnham		Boston, Mass.
Boston & Maine	J. T. Furber	J. T. Furber	Mechanicsville, N.Y.
Boston & Lowell	C. E. A. Bartlett	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Boston, Mass.
Bradford, Bordell & Kinzua	B. C. Williams	B. C. Williams	Worcester, Mass.
Brooklyn, Flatbush & Coney Isl'd	W. E. Dorwin		Bradford, Pa.
Brunswick & Albany	R. D. Meader		Brooklyn, N. Y.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	G. Hargreaves	Brunswick, Ga.
Burlington & Mo. River (in Neb.)	Geo. W. Holdrege		Omaha, Neb.
First Division	J. O. Phillipi		Omaha, Neb.
Burlington, Cedar Rapids & Nor'n	C. J. Ives	Theo. Stickney	Lincoln, Neb.
Burlington & Northwestern	John F. Gerry	John F. Gerry	Cedar Rapids, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo & Southwestern	*John F. Moulton		Burlington, Ia.
Buffalo, New York & Philadelphia	Geo. S. Gatchell	J. H. Pool	Buffalo, N. Y.
			Buffalo, N. Y.

C

Cairo & St. Louis	Chas. Hamilton	Chas. Hamilton	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	G. H. Lyman	Cairo, Ill.
California Pacific & Northern	*J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	F. A. Lister	F. A. Lister	Camden, N. J.
Canada Central	*Archer Baker		Brockville, Can.
Canada Southern	*Wm. P. Taylor		Buffalo, N. Y.
U. S. Division		A. F. Howland	St. Thomas, Ont.
Canada Division	E. P. Murray		Toledo, O.
Canadian Pacific	W. E. Carroll		St. Thomas, Ont.
Carbondale & Shawneetown	J. F. Lynskey		Winnepeg, Man.
Carolina Central	R. J. Cavett		Carbondale, Ill.
Catasauqua & Fogelsville	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Cayuga Southern	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga & Susquehanna	W. Stevenson		Sayre, Pa.
Cazenovia, Canastota & De Ruyter	W. R. Humphreys	John Stebbins	Ithaca, N. Y.
Central Pacific	*A. N. Towne		Cazenovia, N. Y.
Central Pacific	J. A. Fillmore		San Francisco, Cal.
Central Pacific		J. R. Watson	San Francisco, Cal.
Western & Visalia Divisions	A. D. Wilder		Sacramento, Cal.
Truckee Division	Frank Free		Oakland, Cal.
Humboldt Division	G. W. Coddington		Wadsworth, Nev.
Salt Lake Division	A. G. Fell		Carlin, Nev.
Sacramento & Oregon Div.	R. H. Pratt		Ogden, Utah.
Central Vermont	J. W. Hobart		Sacramento, Cal.
Central Vermont	‡J. M. Foss		St. Albans, Vt.
Western Division	John Schrier		St. Albans, Vt.
Northern Division	J. B. Futooys		Ogdensburg, N. Y.
Rutland Division	J. Burdett		St. Johns, P. Q.
New London Northern	G. W. Bentley	G. W. Bentley	Rutland, Vt.
Central of Georgia	Wm. Rogers	Henry Yonge	New London, Conn.
Atlanta Division	W. F. Shellman		Savannah, Ga.
Central of Iowa	D. N. Pickering	D. N. Pickering	Macon, Ga.
Central of New Jersey	James Moore	B. W. Burnet	Marshalltown, Ia.
Central Division	‡W. W. Stearns		Elizabeth, N. J.
Lehigh & Susq. Division	W. S. Polhemus		Elizabeth, N. J.
Champaign, Havana & Western	A. H. Wood		Mauch Chunk, Pa.
Charleston & Savannah	C. S. Gadsden		Urbana, Ill.
Charlotte, Columbia & Augusta	G. R. Talcott	G. R. Talcott	Charleston, S. C.
Chesapeake & Ohio	*C. W. Smith		Columbia, S. C.
Chesapeake & Ohio	W. M. S. Dunn	J. A. Netherland	Richmond, Va.
Cheraw & Darlington	J. F. Divine		Richmond, Va.
Cherokee	John Postell		Society Hill, S.
Cheshire	*R. Stewart	H. H. Stone	Atlanta, Ga.
Chester & Lenoir	James Mason		Keene, N. H.
Chicago & Northwestern	*Marvin Hughitt	R. W. Hamer	Chester, S. C.
Chicago & Northwestern			Chicago, Ill.
Chicago & Northwestern	§Chas. C. Wheeler		Chicago, Ill.
Wisconsin & Mill. Division	E. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Lindsay		Chicago, Ill.
Madison Division	C. A. Swineford		Escanaba, Mich
Galena Division	Chas. Murray		Baraboo, Wis.
Des Moines & Iowa Division	J. M. Whitman		Chicago, Ill.
Winona & St. Peter Division	S. Sanborn		Clinton, Iowa.
Dakota Central Division	T. J. Nichols		Winona, Minn.
Galena & Wisconsin Br.	J. B. Trull		Huron, Dak.
Chicago & Alton	*J. C. McMullen	A. V. Hartwell	Galena, Ill.
Chicago & Alton	C. H. Chappell		Chicago, Ill.
Chicago Division	A. M. Richards		Bloomington, Ill.
Kansas City St. Louis Div.	O. Vaughan		Chicago, Ill.
Chicago & Block Coal	*A. F. Beach		Mexico, Mo.
Chicago, Burlington & Quincy	*Thos. J. Potter	Wm. Irving	Veedersburg, Ind.
Chicago, Burlington & Quincy	John D. Besler		Chicago, Ill.
Chicago, Burlington & Quincy	§E. Ryder		Galesburg, Ill.
Eastern Div.	C. M. Levy		Chicago, Ill.
Middle, Galesb'g & Q'y Div.	H. Hitchcock		Galesburg, Ill.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
St. Louis & R. Isl'd Division	W. R. Crumpton		St. Louis Mo.
Iowa Division	W. C. Perkins		Burlington, Iowa.
Chi., Clinton, Dubuque & Minn.	*F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Chicago & Eastern Illinois	O. S. Lyford	O. S. Lyford	Chicago, Ill.
Chicago & Iowa	W. H. Holcomb, Rec.		Rochelle, Ill.
Chicago & Northeastern	J. M. Turner		Lansing, Mich.
Chicago & Pacific	*J. M. Whitman	James Penny	Chicago, Ill.
Chicago & Paducah	D. H. Conklin		Streator, Ill.
Chicago & Paducah		C. L. Rising	Chicago, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febiger, Jr.	New Orleans, La.
South Division	W. P. McKinley		New Orleans, La.
North Division	J. G. Mann		McComb City, Miss.
Chicago, Rock Island & Pacific	A. Kimball		Jackson, Tenn.
Chicago, Rock Island & Pacific	*R. R. Cable	F. A. Marsh	Chicago, Ill.
Southwestern Division	G. F. Walker		Chicago, Ill.
Iowa Division	H. F. Royce		Trenton, Mo.
Illinois Division	R. H. Chamberlin		Des Moines, Iowa.
Keokuk & Des Moines Div.	John Given		Keokuk, Ia.
Chicago & West Michigan	§C. M. Lawler		Chicago, Ill.
Chicago, Milwaukee & St. Paul	W. C. Van Horne	J. T. Crocker	Milwaukee, Wis.
Dubuque Division	J. H. Jenkins		Dubuque, Iowa.
Wisconsin Valley Div.	H. C. Atkins		Milwaukee, Wis.
Northern Division	L. B. Rock		Milwaukee, Wis.
I. & M. & I. D. Division	C. H. Prior		Minneapolis, Minn.
Wabasha Division	J. H. Lakey		Wabasha, Minn.
Western Union Division	D. A. Olin		Racine, Wis.
Sioux City & Dak. Div.	G. W. Sanborn		Albuquerque, N.M.
Southern Minnesota Div.	J. M. Egan	J. M. Egan	Sioux City, Ia.
Chicago, Pekin & Southwestern	J. Murray	A. H. Cook	La Crosse, Wis
Chicago, St. Paul, Minn. & Omaha	Chas. F. Hatch	W. H. S. Wright	Milwaukee, Wis.
Chippewa Falls & Western	L. C. Stanley		St. Paul, Minn.
Cincinnati Northern	*C. W. Bradley		Chip'waF'lls, Wis.
Cincinnati & Eastern	George H. Wilber		Cincinnati, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Batavia, O.
Cincinnati, Wabash & Michigan	O. W. Lamport		Elkhart, Ind.
Cincinnati, Richmond & Chicago	*Lewis Williams		Wabash, Ind.
Cincinnati, Rockp't & Southwest'n	H. C. Branham	H. C. Branham	Cincinnati, O.
Cincinnati & Terre Haute	John Holland		Rockport, Ind.
Cin., Cumber'd Gap & Charleston	W. J. Taylor		Terre Haute, Ind.
Cincinnati, Hamilton & Dayton	*Lewis Williams	Lewis Williams	Knoxville, Tenn.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati Southern	Sam'l Woodward	Julius Uhlein	Cincinnati, O.
Cin., Indianapolis, St. Louis & Chi.	J. W. Sherwood		Cincinnati, O.
Cin., Indianapolis, St. Louis & Chi.		George Tozzer	Indianapolis, Ind
Cleve., Col., Cin. & Indianapolis	*E. B. Thomas	J. L. Yale	Cincinnati, O.
Indianapolis Division	John O. Ewan		Cleveland, O.
Col. and Cincinnati Divs.	Robert Blee		Union, Ind.
Cleveland & Marietta	S. C. Baldwin	R. B. Hoover	Cleveland, O.
Cleveland & Pittsburg	John Thomas		Marietta, Ohio
Cleveland & Pittsburg	*J. D. Layng	Wm. Mullins	Cleveland, O.
Cleveland, Mt. Vernon & Columb's	G. A. Jones		Pittsburg, Pa.
Cleve., Tuscarawas Val. & Wheel.	*Oscar Townsend		Mt. Vernon, O.
Cobourg, Petersboro & Marmora	James R. Barber	J. R. Barber	Cleveland, O.
Columbia & Greenville	*T. M. R. Talcott		Cobourg, Ont.
Columbia & Greenville	J. W. Fry		Richmond, Va.
Columbus & Hocking Valley	Geo. R. Carr	Geo. R. Carr	Columbia, S. C.
Columbus & Toledo	Geo. R. Carr	Geo. R. Carr	Columbus, O.
Columbus & Rome	T. J. Nuckolls		Columbus, O.
Concord & Claremont	George E. Todd		Columbus, Ga.
Concord	H. E. Chamberlin	H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin		Concord, N. H.
Connecticut Central	D. D. Warren, Pres.		Concord, N. H.
Connecticut River	John Mulligan	John Mulligan	Springfi-ld, Mass.
Connecticut Valley	Samuel Babcock		Springfield, Mass.
Connecticut Western	J. F. Jones		Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom		Hartford, Conn.
Corning, Cowanesque & Antrim	A. H. Gorton	Andrew Beers	Lyndonville, Vt.
Connotton Valley	W. M. Moffet		Coming, N. Y.
Connotton Valley			Canton, Ohio.
Covington, Col. & Black Hills	J. I. Booge	C. G. Patterson	Boston, Mass.
Credit Valley	H. G. Taylor		Sioux City, Iowa.
Cumberland Valley	J. F. Boyd	O. N. Lull	Toronto, Ont.
Cumberland & Pennsylvania	P. L. Burwell	P. L. Burwell	Chambersburg, Pa.
Cumberland & Maurice River	L. H. Dowdney		Cumberland, Md.

D

Danbury & Norwalk	L. W. Sandiforth		Port Norris, N. J.
Danville & Southwestern	James A. Eads		South Norwalk, C.
Danville, Olney & Ohio River	*Chas. Howard		Paris, Ill.
Davenport & Northwestern	D. Flanigan		Kansas, Ill.
Dayton & Michigan	E. E. Dwight		Davenport, Ill.
Dayton & Union	C. C. Gale		Toledo, Ohio.
Dayton & Southeastern	*R. G. Butler	E. F. Pryor	Indianapolis, Ind.
Delaware & Chesapeake	O. S. Sanford		Toledo, O.
Delaware & Hudson Canal Co.	R. Manville	R. Manville	Easton, Md.
Delaware & Hudson Canal Co.	*C. F. Young		Carbondale, Pa.
Albany & Susq. Division	C. D. Hammond		Honesdale, Pa.
Rensselaer & Saratoga Div.	Theo. Voorhees		Albany, N. Y.
Delaware, Lackawanna & Western			Troy, N. Y.
Delaware, Lackawanna & Western		G. W. B. Cushing	New York City.
Bloomsburg Division	G. Bogart		Scranton, Pa.
Morris & Essex Division	Andrew Reasoner		Scranton, Pa.
Oswego & Syracuse Division	W. B. Phelps		Hoboken, N. J.
Utica, Chenango & Sus. Div.	F. J. Griffiths		Oswego, N. Y.
Delaware Western	David Connell		Scranton, Pa.
Denver & Rio Grande	*D. C. Dodge		Wilmington, Del.
Denver & Rio Grande	George W. Cushing		Denver, Col.
First Division		A. B. Garner	Denver, Col.
Second Division	M. C. Kimberly		Colorado Spr's, Col.
Des Moines, Northwestern	W. H. Bancroft		Pueblo, Col.
Des Moines & Ft. Dodge	C. N. Gilmore		Alamosa, Col.
Detroit, Gr. Haven & Milwaukee	C. N. Gilmore	C. N. Gilmore	Des Moines, Iowa.
Detroit, Hillsdale & Southwestern	W. J. Morgan	John S. Lorimer	Des Moines, Iowa.
Detroit, Lansing & Northern	W. F. Parker		Detroit, Mich.
Detroit, Lansing & Northern		Allan Bourn	Ypsilanti, Mich.
Dorchester & Delaware	T. M. Fish		Detroit, Mich.
Dunkirk, Allegheny Val. & Pitts.	Theo. E. Wright		Ionia, Mich.
Dunkirk, Allegheny Val. & Pitts.	D. Thayer		Cambridge, Md.
		R. C. Moore	Dunkirk, N. Y.

E

East Broad Top	A. W. Sims		New York City.
East Alabama	W. W. Barnes		Orbisania, Pa.
East Line & Red River	W. B. Ward		Opelika, Ala.
East Tenn., Virginia & Georgia	**J. P. O'Brien	J. Y. Johnston	Jefferson, Tex.
Selma Division	John M. Bridges		Knoxville, Tenn.
Eastern	**D. W. Sanborn	Geo. J. Fisher	Selma, Ala.
Eastern Kentucky	*H. W. Bates	H. W. Bates	Boston, Mass.
Eastern Shore	W. Thompson		Riverton, Ky.
Erie & Pittsburg	J. M. Kimball		Prince Anne, Md.
Erie & Pittsburg	*J. D. Layng	Wm. Mullins	Erie, Pa.
Eureka & Palisade	P. Evarts		Pittsburg, Pa.
European & North American	F. W. Cram		Palisade, Nev.
Evansville & Terre Haute	J. E. Martin	Jno. L. White	Bangor, Maine.

F

Fitchburg	John Adams	F. S. Pratt	Evansville, Ind.
Vermont & Mass. Div.	§E. K. Turner		Boston, Mass.
Flint & Pere Marquette	Sanford Keeler	G. G. Cook	Fitchburg, Mass
Florida Central	W. M. Davidson	W. M. Davidson	E Saginaw, Mich.
Flushing, North Shore & Central	Samuel Spencer	Samuel Spencer	Jacksonville, Fla.
Fonda, Johnstown & Gloversville	L. Caten		L'g Isl'd Cy, N. Y.
Fon du Lac, Amboy & Peoria	A. Kinyon		Gloversville, N. Y.
Fort Madison & Northwestern	S. B. Kenrick	S. B. Kenrick	Fond du Lac, Wis.
Fort Wayne & Jackson	M. D. Woodford	M. D. Woodford	Fort Madison, Ia.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington	P. Ag't.	Jackson, Mich.
			Fort Wayne, Ind.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Frankfort & Kokomo	A. W. Hazelrigg	E. H. Andress	Lafayette, Ind.
Fredericton	F. B. Edgecombe		Fredericton, N. B.
Freehold & New York	J. E. Ralph	J. E. Ralph	Freehold, N. J.
G			
Gal., Harrisburg & San Antonio	James Converse		Houston, Texas.
Gal., Harrisburg & San Antonio		Chas. Babbidge	Boston, Mass.
Gal., Houston & Henderson	*W. H. Harding	W. H. Harding	Palestine, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson		Sayre, Pa.
Georgia	S. K. Johnson	S. K. Johnson	Augusta, Ga.
Grand Haven	Geo. C. Kimball	H. Park	Allegan, Mich.
G. Rapids, Newaygo & L. Shore	W. A. Nichols	H. Park	G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hugbart, Pres't	W. R. Shelby	G. Rapids, Mich.
Northern Division	J. M. Matheany		G. Rapids, Mich.
Southern Division	P. S. O'Rourke		Fort Wayne, Ind.
Grand Trunk	*J. Hickson	John Taylor	Montreal, Canada.
Grand Trunk	W. J. Spicer		Montreal, Canada.
Chicago Division	S. R. Callaway		Chicago, Ill.
Grand Tower & Carbondale	T. M. Williamson	Wm. W. Harris	Grand Tower, Ill.
Grayville & Mattoon	*G. L. Bradbury		Mattoon, Ill.
Grayville & Mattoon	G. R. Cobleigh		Mattoon, Ill.
Great Western (Canada)	Charles Stiff		Hamilton, Ont.
Great Western (Canada)		G. R. Nash	London, Ont.
Green Bay & Minnesota	*Timothy Case		Green Bay, Wis.
Greenville, Col. & Birmingham	E. P. Buell		Greenville, Miss.
Greenwich & Johnsonville	J. H. Thompson		Greenwich, N. Y.
Gulf, Colorado & Santa Fé	*John Sealey	F. P. Killeen	Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate		Cuero, Texas.
H			
Hamilton & Northwestern	*F. W. Cumberland		Hamilton, Ont.
Hannibal & St. Joseph	*John B. Carson	T. L. Dunn	Hannibal, Mo.
Eastern Division	W. R. Woodard		Hannibal, Mo.
Western Division	W. C. Alberger		Kansas City, Mo.
Hanover Junction & Gettysburg	Henry A. Young	H. A. Young	Hanover, Pa.
Harlem Extension South	*R. C. Root		Bennington, Vt.
Housatonic	L. B. Stillson		Bridgeport, Conn.
Houston, East & West Texas			Houston, Texas.
Houston & Texas Central	A. H. Swanson	A. H. Swanson	Houston, Texas.
Southern Division	M. G. Howe		Houston, Texas
Northern Division	G. A. Quinlan		Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage	S. B. Knight	Huntingdon, Pa.
I			
Illinois Central	E. T. Jeffrey	O. Ott	Chicago, Ill.
Chicago Division	C. A. Beck		Centralia, Ill.
Northern Division	J. C. Jacobs		Amboy, Ill.
Iowa Division	D. W. Parker		Dubuque, Ia.
Springfield Division	T. J. Hudson		Springfield, Ill.
Illinois Midland	L. Genis, *Rec.*	J. G. Clifford	Terre Haute, Ind.
Illinois & St. Louis	C. H. Sharman		St. Louis, Mo.
Indiana, Bloomington & Western	§§C. E. Henderson	H. C. Norton	Indianapolis, Ind.
Ohio Division	D. W. C. Brown		Sandusky, Ohio.
Indianapolis, Decatur & Spring.	F. L. Peck		Indianapolis, Ind.
Indianapolis & St. Louis	C. C. Gale	H. W. Comstock	Indianapolis, Ind.
Indianapolis, Peru & Chicago	§§E. C. Murphy		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Indianapolis & Vincennes	J. J. Turner		Indianapolis, Ind
Intercolonial	D. Pottinger	T. Y. Cooke	Moncton, N. B.
Halifax & St. John Division	Jas. Co'eman		Truro, N. S.
Northern Division	M. Busby		Campbell'n, N. B.
International & Great Northern	*H. M. Hoxie	H. M. Hoxie	Galveston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa.
J			
Jacksonville, N. Western & S. E.	E. S. Greenleaf		Jacksonville, Ill.
Jacksonville, Pen. & Mobile		J. D. Hollister	Tallahassee, Fla.
Jeff., Madison & Indianapolis	E. W. McKenna		Louisville, Ky.
Jeff., Madison & Indianapolis		Wm. Mullins	Pittsburg, Pa.
Junction & Breakwater	Tho. Groome		Lewes, Del.
K			
Kansas Central	W. A. Martin	W. A. Martin	Leavenworth, Kan
Kan. City, Burlington & Santa Fe	James Houston		Burlington, Kan.
Kansas City, Fort Scott & Gulf	L. W. Towne	H. P. Jacques	Kansas City, Mo.
Kansas City, Lawrence & South.	L. W. Towne	H. P. Jacques	Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard		St. Joseph, Mo.
Kansas Pacific	*S. H. H. Clark	A. D. Clark	Omaha, Neb.
Kansas Pacific	S. T. Smith		Kansas City, Mo.
Kaw Valley Division	J. O. Brinkerhoff		Kansas City, Mo.
Smoky Hill Division	J. T. Odell		Ellis, Kansas.
Denver Division	J. T. Odell		Denver, Col.
Cheyenne Division	A. A. Egbert		Denver, Col.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham		Chestertown, Md.
Kentucky Central	*J. D. Ellison		Covington, Ky.
Kingston & Pembroke	H. W. Folger	Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs	C. A. Coombs	Bath, Maine.
Knoxville & Ohio	G. J. Kinzel		Knoxville Tenn.
L			
Lake Erie & Western	*E. H. Waldron	E. H. Andress	Lafayette, Ind.
Sandusky Division	D. S. Hill		Fremont, Ohio.
Bloomington Division	J. B. Clark		LaFayette, Ind.
Lake Ontario Southern	*Jas. E. Briggs		Newark, N. Y.
Lake Shore & Mich. Southern	*John Newell		Cleveland, Onio.
Lake Shore & Mich. Southern	Charles Paine	A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch		Clevelahd, Ohio.
Toledo Division	Thos. Flesher, Jr		Cleveland, Ohio.
Michigan Division	J. E. Curtis		Toledo, Ohio.
Detroit Division	T. J. Charlesworth		Detroit, Mich.
Western Division	J. H. Parsons		Chicago, Ill.
Lansing Division	W. H. Caniff		Lansing, Mich.
Franklin Division	Geo. H. McIntire		Stoneboro, Pa.
Lehigh Valley	Robert H. Sayre		Bethlehem, Pa.
Lehigh Valley		L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr		Mauch Chunk, Pa
Mahanoy Division			Mauch Chunk, Pa.
New Jersey Division			Metuchen, N. J.
Wyoming Division	A. Mitchell		Wilkesbarre, Pa.
Levis & Kennebec	W. C. Hall		Quebec, Can.
Ligonier Valley	Thos. A. Nellon		East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman		Little Rock, Ark.
Little Rock, Miss. River & Texas	J. A. Woodson	J. A. Woodson	Little Rock, Ark.
Los Angeles & Independence	W. J. L. Moulton		Los Angeles, Cal.
Long Island	Austin Corbin, *Rec.*		L'g Isla'd C'y, N.Y.
Louisiana Western	W. Irwin		Vermilionville, La.
Louisville & Nashville	*F. du Pont		Louisville, Ky.
Louisville & Nashville	D. W. C. Rowland	G. C. Breed	Louisville, Ky.
St. L. & S. E. & N. & D. Div.	James Montgomery	J. N. McCoy	Evansville, Ind.
Memphis Line	T. T. Hamilton		Memphis, Tenn.
Nashville & Decatur Div	James Geddes		Nashville, Tenn.
So. & North Ala. Division	E. Marsh		Birmingham, Ala.
Mobile & New Orleans Div			Mobile, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl	Wm. Mahl	Louisville, Ky.
Louisville, New Albany & Chicago	John McLeod	Wm. M. Lewis	Louisville, Ky.
Louisville, N. Albany & St. Louis	H. L. Shepherd		New Albany, Ind.
M			
Macon & Brunswick	Jas. M. Edwards	W. C. Jones	Macon, Ga.
Maine Central	Payson Tucker		Portland, Me.
Manchester & Lawrence	H. E. Chamberlin		Concord, N. H.
Manchester & North Weare	H. E. Chamberlin		Concord, N. H.
Manhattan Beach	A. Corbin, *Pres't*		New York, N. Y.
Manhattan Elevated	*Frank K. Hain	James Tobin	New York, N. Y.
Manhattan Elevated	C. L. Green		New York, N. Y.
Marietta & Cincinnati	Jas. H. Stewart	J. H. Stewart	Cincinnati, O.
Marquette, Houghton & Ontonag'n	*Samuel Schoch	R. M. McCauley	Marquette, Mich.
McKean & Buffalo	S. V. Golden		Smethport, Pa.
Memphis & Little Rock	*Wm. E. Smith	W. E. Smith	Memphis, Tenn.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Memphis & Little Rock	E. K. Sibley		Memphis, Tenn.
Memphis & Charleston	John A. Grant	John A. Grant	Huntsville, Ala.
Memphis, Paducah & Northern	*N. Monsarrat	N. Monsarrat	Paducah, Ky.
Mexican National	*O. Clinton Gardner	A. R. Roberts	New York, N. Y.
Michigan Air Line	*M. S. Hadley		Romeo, Mich.
Michigan Central	*H. B. Ledyard	Allan Bourn	Detroit, Mich.
Michigan Central	E. C. Brown		Jackson, Mich.
Mackinaw & Saginaw Div	W. A. Vaughan		Bay City, Mich.
Main L. e & G. R.& Kal. Div's	C. B. Bush		Jackson, Mich.
Detroit & Bay City Div			Detroit, Mich.
Middleburg & Schoharie	P. S. Demforth		Middleburg, N.Y.
Middletown & Crawford	D. Thompson		[Thompson, Ridge, N.Y
Midland of New Jersey	*H. M. Helton		Jersey City, N. J
Midland Railway of Canada	H. G. Taylor		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. G. H. Reed		Milwaukee, Wis.
Mineral Point	G. W. Cobb	G. W. Cobb	Mineral Point, Wis
Mineral Range	*C. E. Holland		Hancock, Mich.
Minneapolis & St. Louis	*C. H. Hudson		Minneapolis, Minn
Minneapolis & St. Louis	A. H. Crocker		Minneapolis, Minn.
Minnesota Midland	J. H. Lakey		Wabasha, Minn.
Mississippi & Tennessee	M. Burke	M. Burke	Memphis, Tenn.
Missouri Pacific	A. A. Talmage	R. B. Lyle	St. Louis, Mo.
Missouri Pacific	A. W. Dickinson		St. Louis, Mo.
Eastern Division	O. H. Dorrance		St. Louis, Mo.
Central Branch Division	W. W. Fagan		St. Louis, Mo.
Western Division	Warder Cumming		Sedalia, Mo.
Mobile & Alabama Grand Trunk	F. B. Clark, Prest		Mobile, Ala.
Mobile & Ohio	*A. L. Rives	A. L. Rives	Mobile, Ala.
Northern Division	E. S. Hosford		Jackson, Tenn.
Southern Division	C. Fleming		Mobile, Ala.
Mobile & Girard	W. L. Clark		Columbus, Ga.
Mobile & Montgomery	G. o Nason		Montgomery, Ala
Mont Alto	G. B. Weistling		Mont Alto, Pa.
Montgomery & Eufaula	W. F. Shellman		Macon, Ga.
Montpelier & Wells River	W. A. Stowell		Montpelier, Vt.
Montrose	J. I. Blakslee	J. I. Blakslee	Mauch Chunk, Pa.
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co.	New Orleans, La.
Muncy Creek	H. R. Mehrling		Hughesville, Pa.
N			
Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Paige	Chas. E. Paige	Nashua, N. H.
Nashville, Chattanooga & St. Louis	J. W. Thomas		Nashville, Tenn
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	Geo. W. Beach	Geo. W. Beach	Waterbury, Conn.
Nevada County	John F. Kidder		Grass Valley, Cal.
Nebraska	Wm. Irving		Omaha, Neb.
Nevada Central	*Jos. Collett	F. W. Dunn	Battle Mountain, Nev.
Newburg, Dutchess & Connecticut	C. L. Kimball	C. L. Kimball	Dutchess J'n, N.Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	E. B. Burpee	Alf. e Seely	Gibson, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Franklin	A. Vandivort		New Castle, Pa.
New Haven & Derby	E. S. Quintard		New Haven, Conn.
New Haven & Northampton	C. N. Yeamans	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		110 Lib. st., N. Y.
New Orleans & Selma	L. B. Scofield		Selma, Ala.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. B. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	†O. Chanute		New York, N. Y.
New York, Lake Erie & Western	**P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Benj. Thomas		Port Jervis, N. Y.
Susquehanna Division	R. B. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk N. Y.
New York & Greenwood Lake	Wm. P. Harris		Jersey City, N. J.
New York, New Haven & Hartford	*E. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H. Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson R'v	John M. Toucey	R. C. Moore	New York, N. Y.
Hudson River & Harlem Div	C. M. Bissell		New York, N. Y.
Eastern Division	Zenas C. Priest		Utica, N. Y.
Western Division	Geo. H. Burrows		Rochester, N. Y.
New York Central Division	Jas. Tillinghast		Albany, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division	O. M. Shepard		Boston, Mass.
Norwich Division	P. St. M. Andrews		Norwich, Conn.
Western Division	J. C. Raven		Hartford, Conn.
Providence Division	L. W. Palmer		Providence, R. I.
New York & Sea Beach	*C. W. Douglas		Bay Ridge, L. I.
New York, Ontario & Western	Jas. E. Childs		Middletown, N. Y.
Middle Div	N. R. Hankin	Charles Clark	Middletown, N. Y
Northern Division	C. W. Lanpher		Norwich, N. Y.
Southern Division	A. H. Danforth		Middletown, N. Y.
New York, Pennsylvania & Ohio	P. D. Cooper	J. H. Holway	Cleveland, O.
First & Second Divisions	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	T. A. Phillips		Galion, O.
Mahoning Division	J. M. Ferris		Cleveland, O.
New York, Providence & Boston	J. B. Gardiner		Providence, R. I.
New York, Providence & Boston		Giles F. Ward	Stonington, Conn.
Northern Pacific	*Herman Haupt	E. T. Williams	St. Paul, Minn.
Northern Pacific	H. A. Towne		Brainerd, Minn.
Pacific & P. Oreille Div	J. W. Sprague	J. W. Sprague	New Tacoma, W. T.
Missouri Division	D. R. Taylor		Mandon, Dak.
Dakota Division	C. T. Hobart		Fargo, Dak.
Northern of Canada	*F. W. Cumberland		Toronto, Can.
North Carolina	See Redmont Air Line.		
Northern Central	*Frank Thomson		Philadelphia, Pa.
Northern Central		A. W. Sumner	Baltimore, Md.
Baltimore Division	Geo. C. Wilkins		Baltimore, Md.
Elmira & Canandaigua Div	R. Neilson		Elmira, N. Y.
Susquehanna Division	W. A. Baldwin		Williamsport, Pa.
Northern (New Hampshire)	George F. Todd		Concord, N. H.
Northeastern (Georgia)	Lyman Wells		Athens, Ga.
Northeastern (South Carolina)	J. F. Devine		Charleston, S. C.
North Pacific Coast	W. C. Fillmore	W. F. Russell	San Francisco, Cal.
Northwestern Ohio	J. S. Morris		Toledo, O.
Northern & Northwestern	Jas. Webster		Toronto, Can.
O			
Ogdensburg & Lake Champlain	*A. A. Gaddis		Malone, N. Y.
Ogdensburg & Lake Champlain	A. Kloss		Malone, N. Y.
Ohio Central	*G. G. Hadley	F. W. Stewart	Columbus, O.
Ohio Central	F. W. Stewart		Toledo, O.
Ohio & Mississippi	W. W. Peabody	G. E. Atwood	Cincinnati, O.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Old Colony	J. R. Kendrick	R. W. Husted	Boston, Mass.
Northern Division	S. A. Webber		Fitchburg, Mass.
Cape Cod Division	C. H. Nye		Hyannis Mass.
Main Line Division	J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Olean, N. Y.
Olean Bradford & Warren		J. H. Poole	Buffalo, N. Y.
Omaha & Republican Valley	P. J. Nichols		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omaha, Neb.
Oregon & California	J. Brandt, Jr	J. Brandt, Jr	Portland, Oregon.
Oregon Railway & Navigation Co.	G. J. Ainsworth		Portland, Oregon.
Oregonian	J. M. Fillmore		Portland, Oregon.
Owensboro & Nasaville	E. Culverhouse		Owensboro, Ky.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
P			
Paducah & Elizabethtown	Robert Meek		Elizabethtown, Ky.
Painesville & Youngstown	Geo. M. Paten		Youngstown, O.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		York, Pa.
Paw Paw & Toledo & South Haven	John Ihing		Lawton, Mich.
Pennsylvania	*Frank Thomson.	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	W. F. Lockard		Philadelphia, Pa.
Middle Division	S. M. Prevost		Harrisburg, Pa.
Pittsburg Division	Robert Pitcairn		Pittsburg, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	Tho. A. Roberts		Harrisburg, Pa.
West Pennsylvania Division	E. B. Taylor		Allegheny City, Pa.
Lewistown Division	J. B. Hutchinson		Lewistown, Pa.
Pensacola & Selma	Geo. Nason		Pensacola, Fla.
Peoria, Decatur & Evansville	G. R. Cobleigh	G. R. Cobleigh	Peoria, Ill.
Peoria, Pekin & Jacksonville	*Geo. Skinner		Peoria, Ill.
Peoria & Springfield	J. R. Hilliard	J. R. Hilliard	Peoria, Ill.
Petersburg	R. Sully	L. E. Clark	Petersburg, Va.
Philadelphia & Atlantic City	Ellis Clark	Ellis Clark	Philadelphia, Pa.
Philadelphia & Reading	*J. E. Wootten	W. S. Wilson	Philadelphia, Pa.
Catawissa & Williamsport Br.	D. C. Reinhart		Williamsport, Pa.
Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
Lebanon & Tremont	H. W. Tracy		Pine Grove, Pa.
N. Penn. & B. Brook Divis'n.	F. A. Sweigard		Philadelphia, Pa.
Philadelphia & Baltimore Central	Henry Wood	Henry Wood	Philadelphia, Pa.
Philadelphia & Erie	Wm. A. Baldwin		Williamsport, Pa.
Philadelphia & Erie	R. Sully	Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Danv., Haz. & W. Barre Div.	Joseph Crawford		Sunbury, Pa.
Philadelphia, Wilmington & Balt.	H. F Kenney		Philadelphia, Pa.
Philadelphia, Newt'n & New York	L. L. Bush		Philadelphia, Pa.
Piedmont Air-Line	T. M. R. Talcott	R. H. Duesberry	Richmond, Va.
Richmond & Danville Div.	W. A. Green		Richmond, Va.
North Carolina Division	A. B. Andrews		Raleigh, N. C.
Pine River Valley & Stevens Pt.	N. I. James		Richl'nd Cent., Wis.
Pittsburg & Castle Shannon	A. C. Hays		Pittsburg, Pa.
Pittsburg & Lake Erie	R. W. Jones		Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	R. M. Fotheringham, Jr.	William Mullins	Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	*D. W. Caldwell		Pittsburg, Pa.
Pitts., Cin. & St. Louis Div.	J. H. Barrett		Pittsburg, Pa.
Col., Cin. & Ind., Cent. Div.	Ralph Peters		Loganspport, Ind.
Col., Chi. & Ind., Cent. Div.	J. F. Miller		Richmond, Ind.
Indianap. & Vincennes Div.	E. W. McKenna		Indianapolis, Ind.
Cincin. & Musk. Valley Div.	Wm. F. Black		Zanesville, O.
Little Miami Div.			Cincinnati, O.
Pittsburg, Bradford & Buffalo	M. Mandeville		Foxburg, Pa.
Pittsburg, Ft. Wayne & Chicago	*J. D. Layng	William Mullins	Pittsburg, Pa.
Pittsburg, Ft. Wayne & Chicago	C. E. Gorham		Chicago, Ill.
Eastern Division	George S. Griscom		Pittsburg, Pa.
Western Division	C. D. Gorham		Fort Wayne, Ind.
Pittsburg & Western	J. R. Bonner		Allegheny, Pa.
Pittsburg, Titusville & Buffalo	Tho. H. Wilson		Oil City, Pa.
Pittsburg, Titusville & Buffalo		John L. Awl	Pittsburg, Pa.
Pittsburg, Virginia & Charleston	J. M. Byers		Pittsburg, Pa.
Port Dover & Lake Huron	A. B. Atwater		Woodstock, Ont.
Port Royal & Augusta	R. G. Fleming		Augusta, Ga.
Portland & Ogdensburg	Jonas Hamilton	Jonas Hamilton	Portland, Me.
Portland & Rochester	G. P. Wescott, *Rec.*		Portland, Me.
Potomac, Fredericksb'g & Piedt.	Charles Kennedy		Fredericksb'g, Va.
Poughkeepsie, Hartford & Boston	A. Perkins	A. W. Cable	Poughkeepsie, N. Y.
Prince Edward Island	L. B. Archibald	L. B. Archibald	Charlottet'n, P.E.I.
Prospect Park & Coney Island	R. Schermerhorn		Coney Island, N.Y.
Providence & Springfield	William Tinkham	William Tinkham	Providence, R. I.
Providence & Worcester	W. E. Chamberlain		Providence, R. I.
Providence, Warren & Bristol	Waterman Stone		Providence, R. I.
Q			
Quebec, Mont., Ott'a & Occidental	L. A. Senecal.	W. E. Blumhart	Montreal, Can.
Quebec Central	$A. Steele		Sherbrooke, Can.
Queen Anne & Kent County	P. H. Irwin		Centreville, Md.
Quincy, Missouri & Pacific	F. D. Schermerhorn		Quincy, Ill.
R			
Raleigh & Augusta Air-Line	J. C. Winder		Raleigh, N. C.
Raleigh & Gaston	J. C. Winder		Raleigh, N. C.
Rhinebeck & Connecticut	J. H. Jones		Rondout, N. Y.
Richmond, York Riv. & Chesap'ke	H. T. Douglas	B. S. Crouch	Richmond, Va.
Richmond & Allegheny	*Decatur Axtell		Richmond, Va.
Richmond & Danville	(See Piedmont Air-Line).		
Richmond, Frederick'b'g & Potomac	E. T. D. Myers	T. L. Courtney	Richmond, Va.
Richmond & Petersburg	Theo. D. Kline		Richmond, Va.
Rio Grande	*M. J. Gomila		Brownsville, Tex.
Rochester & Pittsburg	Geo. E. Merchant	Geo. E. Merchant	Rochester, N. Y.
Rockwood & Tennessee River	H. Clay Evans		Rockwood, Tenn.
Rock Island & Mercer County	*R. R. Cable		Rock Island, Ill.
Rock Island & Peoria	H. B. Ludlow		Rock Island, Ill.
Rome	Eben Hillyer		Rome, Ga.
Rome, Watertown & Ogdensburg	E. A. Van Horne		Watertown, N. Y.
Rome, Watertown & Ogdensburg		G. W. B. Cushing	New York City.
Rumford & Buckfield	O. Hayford		Canton, Me.
S			
Scioto Valley	Joseph Robinson		Columbus, O.
Sciota Valley		C. H. Cory	Portsmouth, O.
St. Croix & Penobscot	Wallace Haycock		Milltown, Me.
St. Lawrence & Ottawa	*Tho. Reynolds	Tho. Reynolds	Ottawa Can.
St. Johns	R. McLaughlin		Jacksonville, Fla.
St. Johns & Indian River	W. H. Churchill		Titusville, Fla.
St. John & Maine	H. D. McLeod		St. John, N. B.
St. Johnsbury & Lake Champlain	A. B. Jewett		St. Johnsbury, Vt.
St. Joseph & Des Moines	J. F. Barnard		St. Joseph, Mo.
St. Joseph & Western	L. D. Tuthill		St. Joseph, Mo.
St. Joseph & Western		A. D. Clarke	Omaha, Neb.
St. Louis, Alton & Terre Haute	Beriah Warren	Beriah Warren	St. Louis, Mo.
St. Louis, Hannibal & Keokuk	W. W. Walker		Hannibal, Mo.
St. Louis, Iron Mountain & Southern	Arthur W. Soper	W. S. Cuddy	St. Louis, Mo.
Texas Division			Texarkana, Ark.
Missouri Division	Wm. Kerrigan		St. Louis, Mo.
St. Louis & San Francisco	*C. W. Rogers	A. G. Thompson	St. Louis, Mo.
St. Louis & San Francisco	†D. H. Nichols		Springfield, Mo.
Kansas Division	W. A. Thoms		Neodesha, Kan.
St. Louis, Keokuk & Northwest'n.	L. Griffin	John A. Blood	Keokuk, Ia.
St. Louis, Salem & Little Rock	E. B. Sankey		Salem, Mo.
St. Louis, Salem & Little Rock		H. A. Crawford	St. Louis, Mo.
St. Louis Bridge & Tunnel R.R.	J. B. Van Dyne	J. E. Williams, Jr.	St. Louis, Mo.
St. Paul & Duluth	Geo. H. Smith		St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	*Jas. J. Hill	J. C. Morrison	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	E. B. Wakeman		St. Paul, Minn.
St. Paul & Sioux City	E. W. Winter		St. Paul, Minn.
Sacramento & Placerville	Josiah Johnson		Sacramento, Cal.
Saginaw Valley & St. Louis	N. W. Merrill	N. W. Merrill	Saginaw, Mich.
San Francisco & North Pacific	H. C. Whiting		Petaluma, Cal.
San Rafael & San Quentin	David Nye		San Rafael, Cal.
Savannah, Florida & Western	*H. S. Haines	W. B. McKee	Savannah, Ga.
Savannah, Florida & Western	†F. S. Pendergast		Savannah, Ga.
Savannah & Memphis	*G. J. Foreacre		Atlanta, Ga.
Seaboard & Roanoke	J. M. Robinson		Baltimore, Md.
Sedalia, Warsaw & Southern	G. H. Huntington	J. A. Walton	Sedalia, Mo.
Selma & Greensboro	A. M. Fowlkes		Selma, Ala.
Sheboygan & Fond du Lac	E. J. Cuyler		Fond du Lac, Wis.
Shenango & Allegheny	J. T. Blair		Greenville, Pa.
Shepaug	Edwin McNeill		Litchfield, Conn.
Sioux City & Pacific	J. S. Wattles		Missouri Valley, Ia.
Sioux City & Pacific	*P. E. Hall	P. E. Hall	Cedar Rapids, Ia.
Skaneateles	J. McNamara		Skaneateles, N. Y.
South Carolina	John B. Peck	S. B. Pickens	Charleston, S. C.
Southeastern of Canada	H. A. Alden		Newport, Vt.
Southern Central	Jas. G. Knapp		Auburn, N. Y.
South Mountain	W. H. Woodward		Pine Grove Furnace, Pa.
Southern Pacific	C. A. C. Bassett	John R. Watson	San Francisco, Cal.
Los Angeles & Yuma Div	†E. E. Hewitt		Los Angeles, Cal.
Tulare Division	A. D. Wilder		Oakland, Cal.
South Pacific Coast	F. W. Bowen		San Francisco, Cal.
Southwestern of Georgia	W. G. Raoul		Macon, Ga.
Southwestern of Kentucky	M. Tabler		Harrodsburg, Ky.
Spartanburg, Union & Columbia	Jas. Anderson	Jas. Anderson	Spartanburg, S. C.
Springfield, Athol & Northeastern	John W. Phelps		Springfield, Mass.
Springfield & Northwestern	E. B. Hyde	E. B. Hyde	Springfield, Ill.
Springfield Southern	Ford Woods	G. A. Barnes	Springfield, O.
Springhill & Parsboro	J. A. Killam		Parsboro, N. S.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Staten Island	John W. Wilber		Tottenville, N. Y.
Sterling Mountain	J. C. Missimer		Sloatsburg, N. Y.
Summit Branch	R. C. Peebles		Lykens, Pa.
Summit County	W. M. Riter		Coalville, Utah.
Sussex	E. T. Case	E. C. Case	Newtown, N. J.
Syracuse, Binghamton & N. Y.	W. K. Niver		Syracuse, N. Y.
Syracuse, Binghamton & N. Y.		G. W. B. Cushing	New York, N. Y.
Syracuse, Chenango & New York	Albert Allen		Syracuse, N. Y.
Syracuse, Geneva & Corning	A. H. Gorton	Andrew Beers	Corning, N. Y.
T			
Tennessee & Pacific	J. W. Thomas		Nashville, Tenn.
Terre Haute & Ind'apolis } Van- }	Col. Josh A. Hil		St. Louis, Mo.
Terre Haute & Ind'apolis } dalia }	Joshua Staples		Indianapolis, Ind.
Terre Haute & Ind'apolis } Line. }		C. R. Peddle	Terre Haute, Ind.
Logansport Division			Logansport, Ind.
Terre Haute & Southeastern	George Atherton		Terre Haute, Ind.
Texas & New Orleans	C. A. Burton	P. B. Watson	Houston, Tex.
Texas & Pacific	H. M. Hoxie	C. C. Commisky	Marshall, Tex.
Jefferson Division	J. S. Noble		Texarkana, Ark.
Southern Division	C. Harris		Marshall, Tex.
Texas Western	J. W. Goodwin		Houston, Tex.
Texas & St. Louis	J. W. Brown		Tyler, Tex.
Tioga	L. H. Shattuck		Blossburg, Pa.
Tioga		Jas. A. Drake	Elmira, N. Y.
Toledo, Delphos & Burlington	W. G. Brownson	H. A. Eaton	Delphos, O.
Dayton Division	J. O. Arnold		Dayton, Ohio.
Toledo & Ann Arbor	H. W. Ashley		Ann Arbor, Mich.
Troy & Boston	E. E. Aldrich	D. Robinson	Troy, N. Y.
Toronto, Grey & Bruce	*Edmund Wragge	W. Watson	Toronto, Can.
Toronto & Nipissing	John Duncan	John Symons	Toronto, Can.
Tuckerton	J. J. Pharo		Tuckerton, N. J.
U			
Ulster & Delaware	Geo. Coykendall		Rondout, N. Y.
Union Pacific	*S. H. H. Clarke	A. D. Clark	Omaha, Neb.
Union Pacific	‡Jas. T. Clarke		Omaha, Neb.
Eastern Division	P. J. Nichols		Omaha, Neb.
Western Division	W. R. Doddridge		Evanston, Wy. T.
Mountain Division	Robert Law		Cheyenne, Wy. T.
Laramie Division	Edw. Dickinson		Laramie, Wy. T.
Colorado Division	A. A. Egbert		Denver, Col.
Kansas Division	S. T. Smith		Kansas City, Mo.
Denver & S. Park Division	C. W. Fisher		Denver, Col.
Utah Central	John Sharp	S. H. Hill	Salt Lake City.
Utah Northern	Geo. W. Thatcher		Logan, Utah.
Utah Western	*W. W. Riter	W. W. Riter	Salt Lake City.
Utica & Black River	J. F. Maynard		Utica, N. Y.
Utica, Ithaca & Elmira	Geo. J. Rice	J. L. Greatsinger	Horse Heads, N. Y.
V			
Valley	Samuel Briggs	Samuel Briggs	Cleveland, O.
Vicksburg & Brunswick	W. G. Raoul		Macon, Ga.
Vermont Valley	John Mulligan		Springfield, Mass.
Vicksburg & Meridian	E. F. Raworth	E. F. Raworth	Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	*J. W. Green	J. W. Green	Monroe, La.
Virginia & Truckee	H. M. Yerington	C. P. Mason	Carson, Nev.
Virginia Midland	Peyton Randolph		Alexandria, Va.
W			
Wabash, St. Louis & Pacific	*John C. Gault	R. W. Green	St. Louis, Mo.
Eastern Division	R. Andrews		Toledo, O.
Western Division	Thos. McKissock		St. Louis, Mo.
Illinois Division	H. F. Clark		Springfield, Ill.
Ohio & Indiana Division	K. H. Wade		Fort Wayne, Ind.
St. L., K. C. & N.	R. Parsill		Moberly, Mo.
Council Bluffs & Omaha Div.	J. W. Blanchard		Strawberry, Mo.
Peoria & Iowa Division	W. F. Merrill		Peoria, Ill.
Kansas City Division	M. G. Cary		Kansas City, Mo
Quincy, Mo. & Pacific Div.	F. D. Schermerhorn		Quincy, Ill.
Chicago Division	A. H. Wood		Bement, Ill.
Iowa Division	E. N. Armstrong		Keokuk, Ia.
Rantoul Division	T. B. Burnett		Rantoul, Ill.
Wabash, Chester & Western	J. L. Hinkley		Chester, Ill.
Walkill Valley	J. H. Jones		Rondout, N. Y.
Washington & Ohio	R. H. Havener	R. H. Havener	Alexandria, Va.
Waukon & Mississippi	F. O. Wyatt		Dubuque, Ia.
Waynesburg & Washington	Jacob Swart		Waynesburg, Pa.
Welland	William Fay		St. Catherine, Ont
Westchester & Philadelphia	Henry Wood	Henry Wood	Philadelphia, Pa.
West Feliciana	J. R. McGehee		Laurel Hill, La.
West Jersey	Jos. Crawford		Camden, N. J.
Western of Alabama	*Cecil Gabbett	Cecil Gabbett	Montgomery, Ala.
Western of North Carolina	L. C. Jones		Fayetteville, N. C.
Western & Atlantic	Wm. McRae	W. R. Webster	Atlanta, Ga.
Western Maryland	*J. M. Hood	J. M. Hood	Baltimore, Md.
Western North Carolina	A. B. Andrews	Geo. P. Erwin	Asheville, N. C.
Whitewater	W. W. Worthington		Ft. Wayne, Ind.
Whitby, Port Perry & Lindsay	*Jas. Holden		Whitby, Ont.
Wicomico & Pocomoke	H. R. Pitts		Berlin, Md.
Williamstown	J. F. Bodine		Williamstown, N.J.
Wilmington, Columbia & Augusta	J. F. Divine	J. F. Divine	Wilmington, N. C.
Wilmington & Northern	J. H. Thompson		Coatesville, Pa.
Wilmington & Weldon	J. F. Divine	J. F. Divine	Wilmington, N. C.
Windsor & Annapolis	*P. Innes		Kentville, N. S.
Wisconsin Central	*F. N. Finney	J. W. Curtiss	Milwaukee, Wis.
Wisconsin Central	Mil. & Eastern Div.	C. F. Dutton	Milwaukee, Wis.
	So. Mid. & Northern.	G. Campbell	Steven's Point, Wis.
Wisconsin Valley	F. O. Wyatt		Tomah, Wis.
Woodstock	J. G. Porter		Woodstock, Vt.
Worcester & Nashua	G. W. Hurlburt	C. S. Turner	Worcester, Mass.
Worcester & Shrewsbury	J. F. Bigelow		Worcester, Mass.
Worcester & Somerset	F. J. Palmer		Philadelphia, Pa.
Y			
Youghiogheny	Wm. Wilson		Irwin's, Pa

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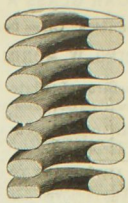
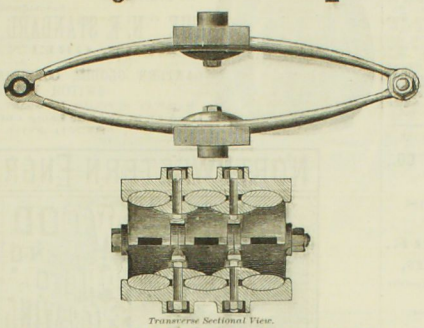
Capacity, 16,500 lbs.

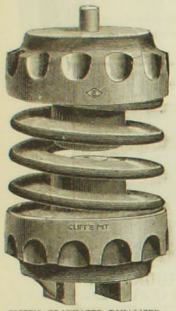


Sectional.
CLIFF BUFFER.
5¼ x 8. 2¼ in. hole.
Capacity, 16,500 lbs.

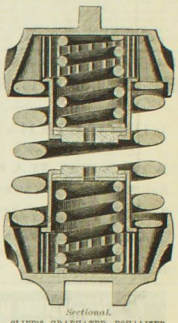


Transverse Sectional View.

ACME TRIPLET FREIGHT ELLIPTIC.
CLIFF'S PATENT, MARCH 29, 1881.
22 in. long. 6¼ in. bearing to bearing.
Capacity, 28,500 lbs.



CLIFF'S GRADUATED EQUALIZER.
7½ in. diam., 11½ in. high.
Capacity graduated from 7,000 to 10,000 lbs.



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7½ in. diam., 11½ in. high.
Capacity graduated from 7,000 to 10,500 lbs.

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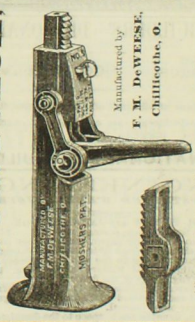

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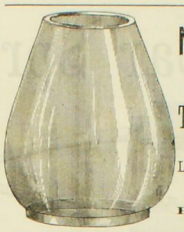

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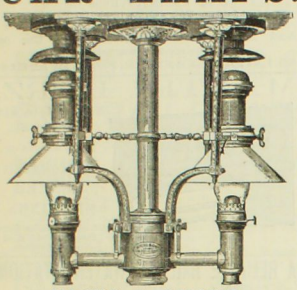

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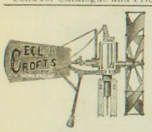

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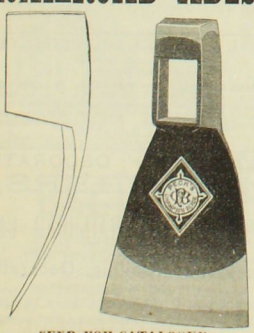

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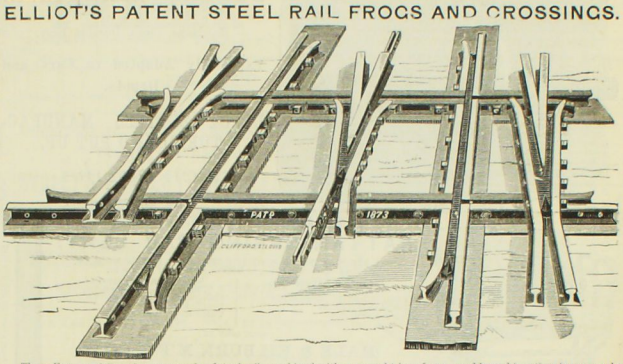

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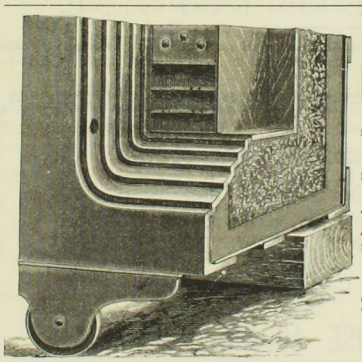

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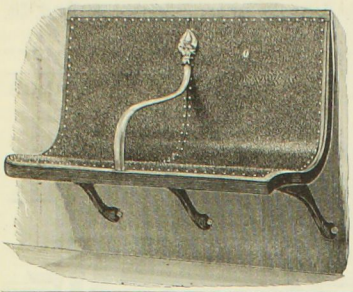

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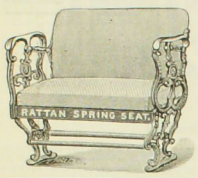

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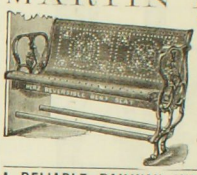

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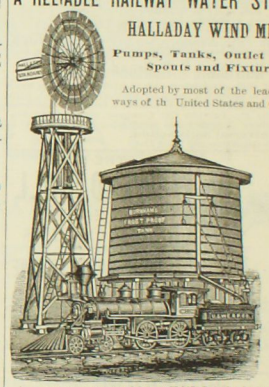

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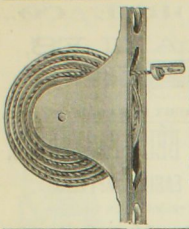

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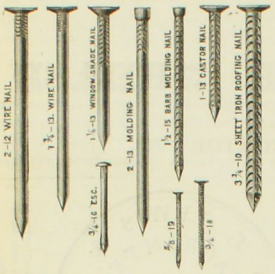

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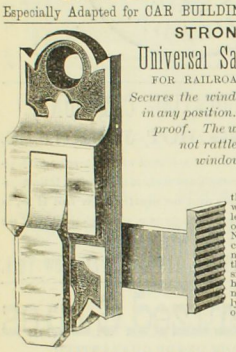

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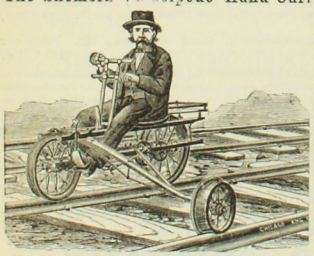

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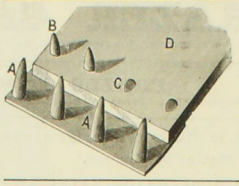

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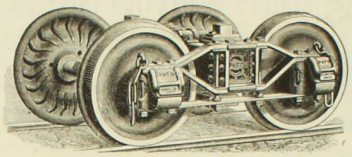

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We respectfully refer you to the following railroads using this Truck:

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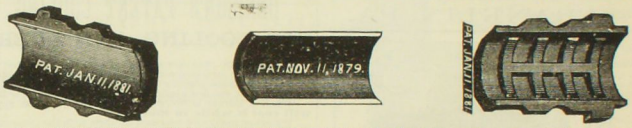

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FROM 1-4 TO 10,000 lbs. WEIGHT.

True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings or cast-iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over other steel castings.

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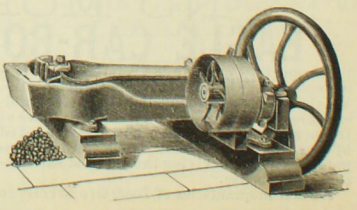

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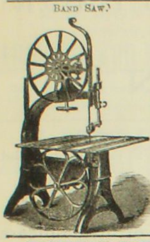

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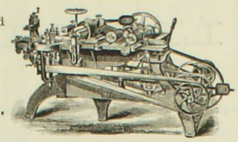

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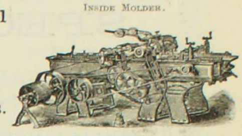

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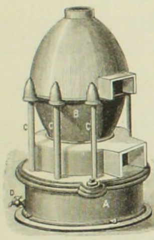
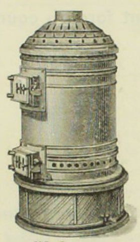
No. 1.—Stove without Jacket. Letter A, Cast-iron Tank, containing 16 gallons of water, and will immediately extinguish the fire when the car is overturned; letter B, Fire Pot; letter CC, Pipes leading from Tank into Fire Pot; letter D, *Discharge Cock*; letter E, *Filler*.



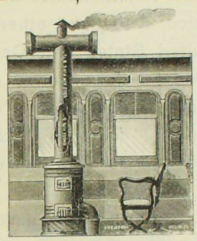
NO. 1.

No. 2.—Stove as set up in car, and will burn either hard or soft coal or coke. PRICE of Nos. 2 and 3, **$40.00**, ON CARS HERE. This does not include Smoke or Air Pipes.



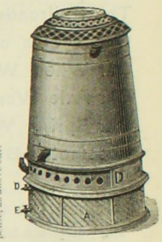
NO. 2.

No. 3.—Designed for conducting hot air along the sides of the car, distributing same by means of the registers equally throughout the entire car, changing the air every three to five minutes, forcing the impure air out at the top of car—thus *heating* and *ventilating* the car perfectly.



NO. 3.

BAKER HEATER, WITH WINSLOW'S SAFETY TANK, as applied to Heaters on L. S. & M. S. R'y and Wagner Sleeping Car Co. Mail or Palace Cars that have Baker Heaters can be supplied with our Safety Tank at trifling expense, as above cut.



It has proved a great success as a heater, on account of the very large volume of air heated.

It also fills the great desideratum so long sought for, *perfect ventilation* during the summer by discharging a constant stream of cold air through the registers, keeping car free from dust and cinders

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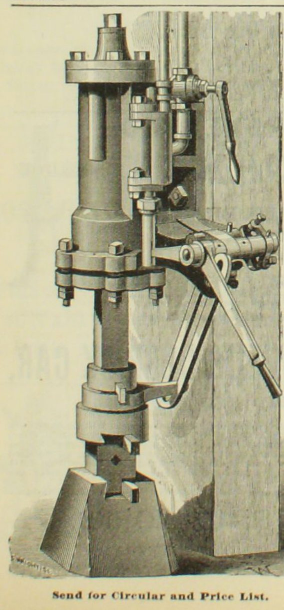

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EUREKA SELF-ACTING STEAM HAMMER.

TESTIMONIALS.

The following communications are respectfully submitted, a perusal of which will convince any one who has work that a EUREKA STEAM HAMMER will do, that they cannot afford to be without one or more; they will soon pay for themselves by saving on pay-roll.

Jackson & Woodin M'f'g Co., Car Builders,
A. H. KING, Esq. Berwick, Pa., Jan. 12, 1881.

Dear Sir: We have had one of the Eureka Steam Hammers bought of you, in constant use during the past year, and are now placing the second one in position. The Eureka does the work in a manner highly satisfactory, greatly increasing the capacity of our smith shop, and making such a saving of time and labor, that we consider it one of the most economical machines in our works. Our experience with the Eureka Hammer justifies us in giving it our highest recommendation.

Yours truly, C. R. WOODIN, Pres.
The Jackson & Woodin M'f'g Co.

Harrisburg Car M'f'g Co., Harrisburg, Pa., Nov. 11, 1880.
A. H. KING, Esq., 46 Cortlandt st., N. Y.

Dear Sir: Please ship us one Eureka Steam Hammer, 5 × 10 inches; make the delivery as early as possible.

Respectfully yours, W. T. HILDRUP, Supt.

A. H. KING, Esq. Harrisburg, Pa., Dec. 2, 1880.

Dear Sir: Please send us as soon as you can one Eureka Steam Hammer, 6¾ × 24 inches; send as early as possible. Will probably want another, 5 × 10 inches. Hope you have the above so that you can send it at once.

Respectfully yours, W. T. HILDRUP, Supt.

A. H. KING, Esq. Harrisburg, Pa., Jan. 6, 1881.

Dear Sir: You will please send to our Foundry and Machine Works, Harrisburg, Pa., one of your Eureka Steam Hammers, 5½ × 16 inches. Please send it as early as possible.

Respectfully yours, W. T. HILDRUP, Supt.

National Car Spring Co.,
A. H. KING, Esq. Newark, N. J., Jan. 15, 1881.

Dear Sir: You ask my opinion of the Eureka Steam Hammer. Well, sir, we have one in use at the present, and, all I can say, I would hardly know what to do without it. It does our work nicely. We hammer Iron 4 inches wide, 1 inch thick, down to ½ inch, with one heat, and it does it nicely. We have had this Hammer about two years, and have had it running most every day; for my part, I think it is a first-class Hammer. Hoping this is satisfactory, I remain,

Yours truly, D. P. CLARK, Supt.

A. H. KING, Esq. Greenpoint, Brooklyn, N. Y., Jan., 1881.

Dear Sir: We have used three Eureka Steam Hammers for some time, and they work first rate. We sold one, as we thought it too small for our use; afterward we attempted to purchase it back from the party we sold it to, but they would not part with it; we therefore bought another new one.

Yours truly, T. F. ROWLAND,
Proprietor, Continental Iron Works.

North River Iron Works, 266 and 267 West st.,
A. H. KING, Esq. New York, January, 1881.

Dear Sir: We have two Eureka Steam Hammers at work in our shops; we are entirely satisfied with them, and would not be without them for a good deal. We recommend them to any one who does forging.

Yours respectfully, W. & A. FLETCHER.

Office of the American Tube Works, Boston, Mass., Jan., 1881
A. H. KING, Esq., 46 Cortlandt st., N. Y.

Dear Sir: We have used the Eureka Steam Hammer a long time, and would not be without it. It is easily worked by ordinary smith's helper.

Yours respectfully, E. B. BUCKINGHAM, Pres.

H. C. Sergeant, Pres. Sergeant & Cullingworth Co.,
G. R. Cullingworth, Sec. Machine Manufacturers,
382 Second ave., cor 22d st.,
A. H. KING, Esq. New York, January, 1881.

Dear Sir: We have had a Eureka Steam Hammer in use about nine months, and find it very useful for our work. We think there is no better. Yours respectfully,

SERGEANT & CULLINGWORTH CO.

Sam'l Hall's Son, Manufacturer of Screw Bolts, Nuts and Washers, 229 West Tenth st., New York, Jan. 15, 1881.
A. H. KING, Esq., 46 Cortlandt st., N. Y.

Dear Sir: In reply to yours I would say we have used one of the Eureka Steam Hammers a long time, forging heads on large bolts and other general work, which it does exceedingly well. Am much pleased with it.

Yours truly, SAM'L HALL'S SON.

Tubal Cain Iron Works, 127 Water st.,
A. H. KING, Esq. Brooklyn, January, 1881.

Dear Sir: We find the Eureka Steam Hammer does our work very well. The Square Piston Rod is a most excellent feature, as it is easily packed and prevents the Hammer from twisting. We would recommend it in the highest terms to those requiring a Steam Hammer.

Yours very respectfully, JOHN ROBERTSON & CO.,
Proprietors, Tubal Cain Iron Works

ALBERT H. KING, 46 Cortlandt St., New York, U. S. A.

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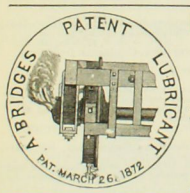

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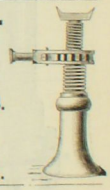

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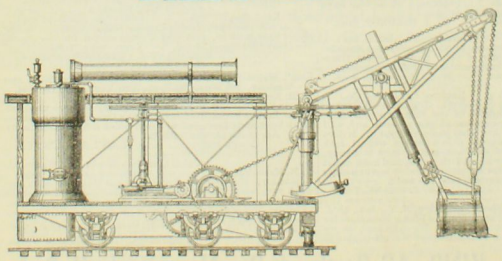

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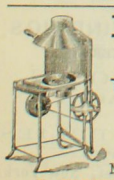

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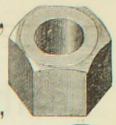

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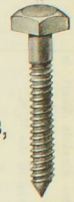

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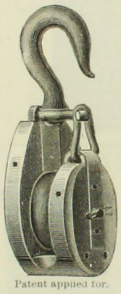

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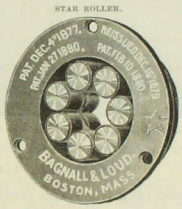

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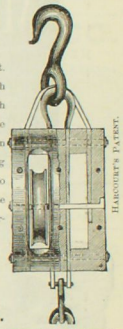

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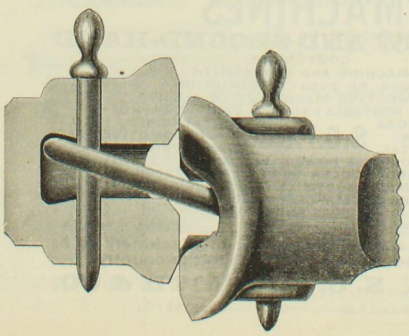

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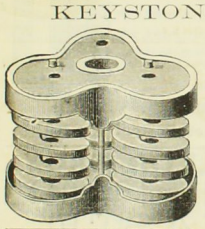

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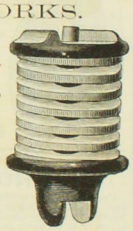

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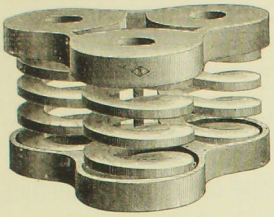

Diameter..... 11¼ inches.
Height..... 6¼ "
Weight..... 72¼ lbs.
Capacity, each spring, 30,000 lbs.

NO. 5 DEY STREET,

NEW YORK.

NATIONAL

Car Spring Company,

RICHARD VOSE, President.

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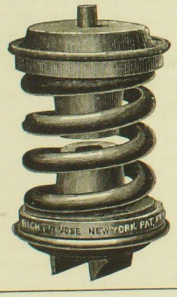

Adapted to a Car-Body Weighing 32,000 Lbs.
Diameter, outside Casting, 8 in.
Height, Bearing to Bearing, 11¼ in.

Atwood Safety Nut Co.,
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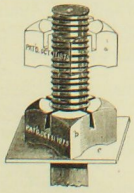

J. W. LARRABEE, Treasurer.

a, ATWOOD NUT on bolt without bearing on base—slots open. b, ATWOOD NUT turned to bearing c, partially closing the slots and grasping the bolt.

Eureka Edge Rolled Elliptic Truss Spring.

Patented July 7, 1874. Reissue March 9, 1875.

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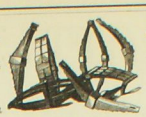

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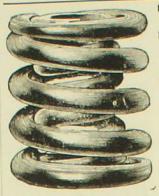

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Street Car, Buffer, Freight Bolster,
Journal and Equalizing Bar Springs.
Brake Release, Switch, Valve and Machinery Springs.

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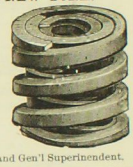

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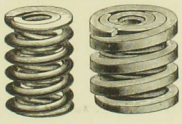

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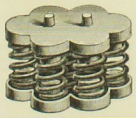

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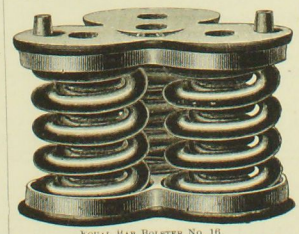

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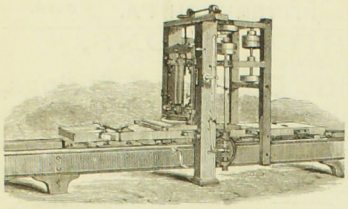

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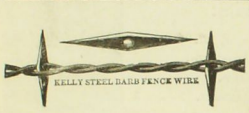

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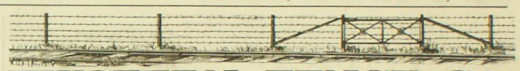

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